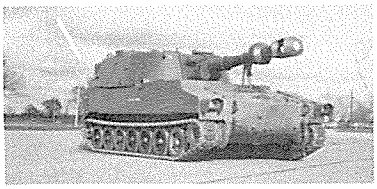
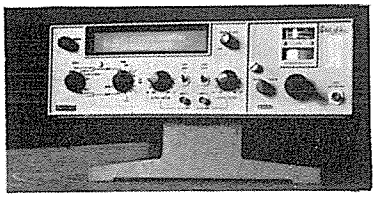
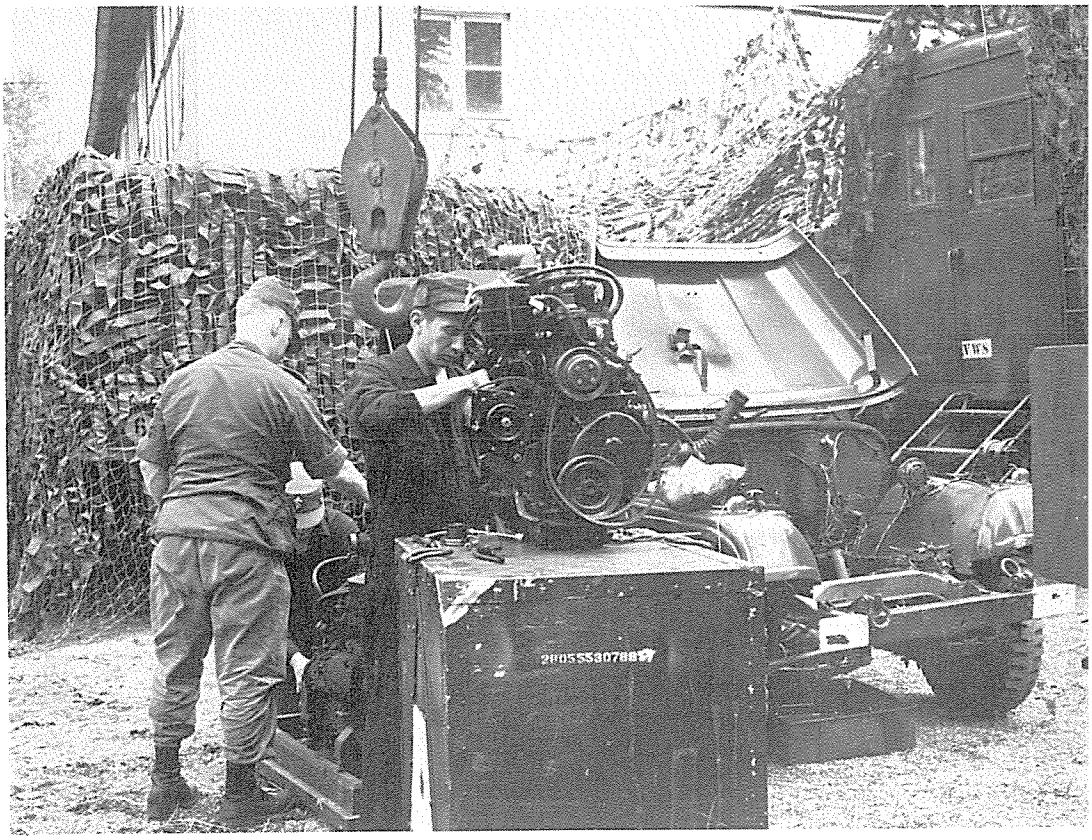
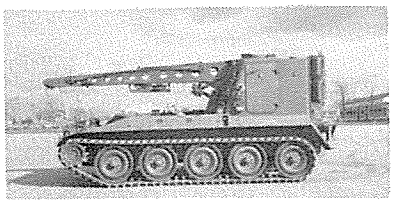
TECHNICAL BULLETIN









VOLUME 13 NUMBER 3 NOVEMBER 1968

RCEME TECHNICAL BULLETIN

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THE BULLETIN IS PUBLISHED TO ASSIST RCEME PERSONNEL IN KEEPING ABREAST OF CURRENT TRENDS IN DEVELOPMENTS AND TO CIRCULATE NEWS OF THE CORPS AND INDIVIDUAL ACTIVITIES AND TO PROVIDE A FORUM FOR DISCUSSION AND THE EXCHANGE OF IDEAS BY MEMBERS OF THE CORPS.

THE INFORMATION AND STATEMENTS HEREIN DO NOT NECESSARILY REPRESENT OFFICIAL POLICY AND ARE NOT TO BE QUOTED AS AUTHORITY FOR ACTION.

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EDITORIAL

We have been able, in this Edition, to come closer to our ideal and concentrate more on technical articles rather than straight news. It is also gratifying to see that the proportion of contributions from warrant officers and non commissioned officers is increasing,we hope this is a trend that will continue.

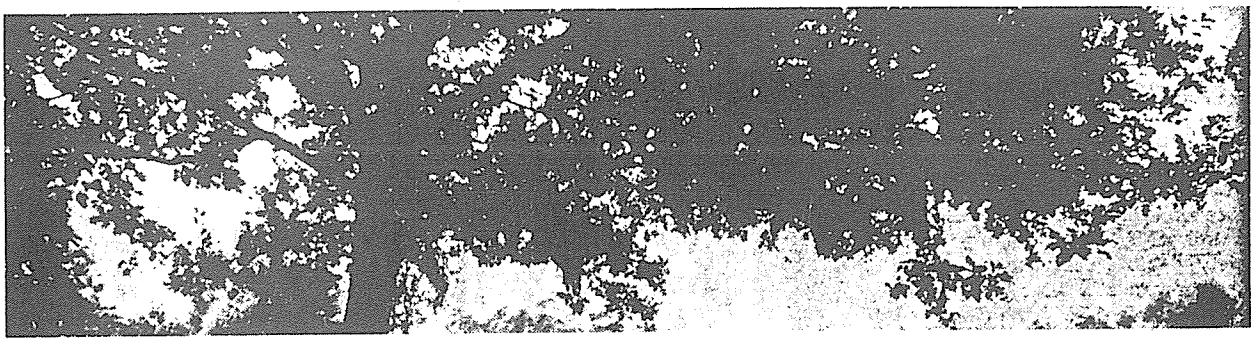
Two officers have contributed articles based on courses they have recently completed.Captain A Nellestyn finished his course this year at the Imperial College of Science, London; and Lieut-Colonel ALD Macdonell is a graduate of the US Air Force School of Management. We would like to hear more from anyone lucky enough to attend any unusual course.

Many readers may already have heard that THE RCEME SCHOOL and the RCS of S are being combined to form the

CANADIAN FORCES SCHOOL OF COMMUNICATIONS AND LAND ORDNANCE ENGINEERING.

It is too early to publish any details of the new school suffice it to say that the Commandant designate is Col LH Wylie presently commanding the RCS of S. We expect to carry details of the reorganization in our next edition.

IN MEMORY



"I have seen war. I have seen war on land and sea. I have seen blood running from the wounded. I have seen men coughing out their gassed lungs. I have seen the dead in the mud. I have seen cities destroyed. I have seen two hundred limping, exhausted men come out of line—the survivors of a regiment of one thousand that went forward forty-eight hours before. I have seen children starving. I have seen the agony of mothers and wives. I hate war."

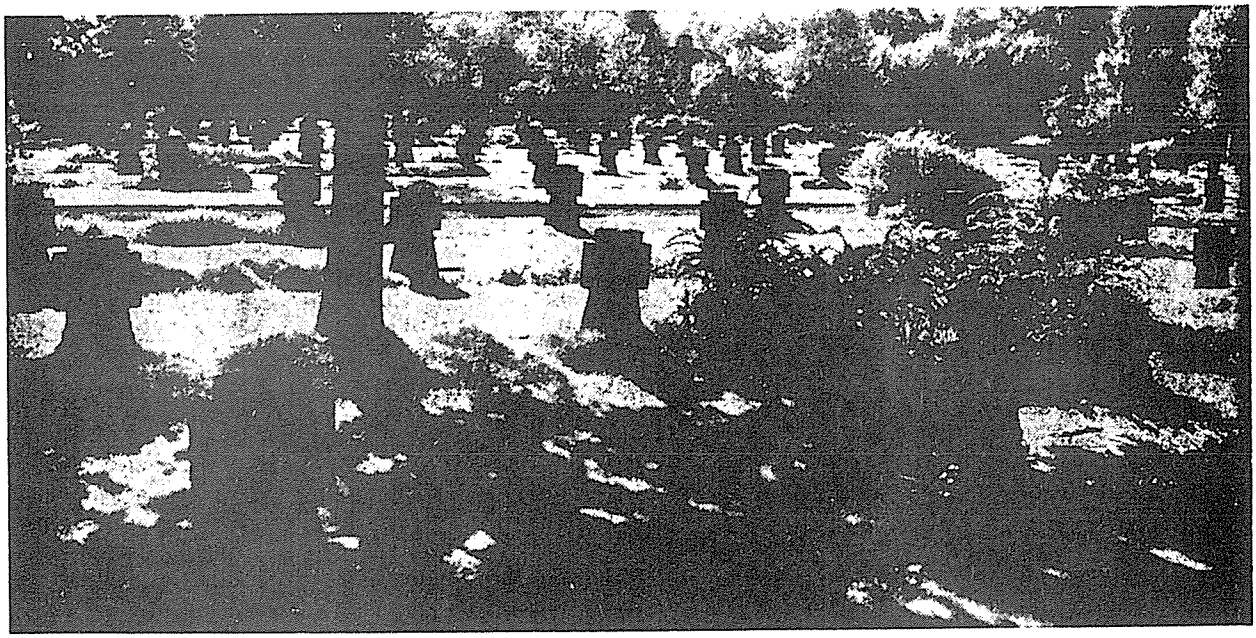
Franklin D. Roosevelt
November, 1936

"When evening was come, the battleground was strewn with the dead and dying. Then through the summer air came a whisper: 'You there, on the other side, are you still there?'. A pause; then: 'Yes, we are still here'. Silence. After a while came the whisper again: 'You there, on the other side, why did we fight?'. Silence. A long pause; then: 'We don't know. We don't know'. And presently the whispers all faded. No one spoke. The voices were still. For ever."

W. A. Wallace
November, 1945

"History with its flickering lamp stumbles along the trail of the past... The only guide to a man is his conscience; the only shield to his memory is the rectitude and sincerity of his actions. It is very imprudent to walk through life without this shield, because we are so often mocked by the failure of our hopes and the upsetting of our calculations; but with this shield, however the fates may play, we march always in the ranks of honour."

Winston S. Churchill
November, 1940



Our salvation will come when we realise that peace, as much as war, demands the utmost of the best that we have and for the same reason ... THAT NOTHING LESS WILL DO!

LATEST INFORMATION

A Land Materiel Maintenance Conference will be sponsored by THE RCEME SCHOOL on 22, 23 and 24 Jan 69. Invitations to attend this conference will be mailed very soon.

The Annual RCEME Officers' Dining out Mess Dinner will be held at the CORPS OF RCEME Officers Mess on 24 Jan 69. It is hoped that as many serving officers as possible will attend, so please keep this date open.

It is becoming more difficult to maintain an up-to date officers mailing list. Please forward a change of address announcement to the Editor.

Change of address forms are available at any post office, the service is free.

THE NUCLEAR REACTOR

by

CAPTAIN ANDREW NELLESTYN

INTRODUCTION

In the article "Radioisotopes and Their Applications" (1), the beneficial exploitation of radioactive isotopes, it was, said was made possible by the advent of the nuclear reactor. Apart from isotope production, generally a side-line in either research or power reactors, the nuclear reactor also finds uses in the production of:

(i) steam for chemical plants
(ii) steam for electricity producing plants
(iii) propulsion for nuclear rockets.

This article will deal with a description of reactor components and operation and also the discoveries and physics concerned with sustaining and producing the chain reaction, fission, upon which the reactor operates.

HISTORY

Twenty-five years ago Fermi produced the first self-sustaining chain reaction. Fermi's work marked the birth of reactors.

The discovery of the neutron by Chadwick in 1932 led to a new field of study - the bombardment of other substances by neutrons. Perhaps the most interesting of these studies dealt with the bombardment of Uranium 235. Names of scientists such as Curie, Savitch, Hahn, Strassman, and many others appear in conjunction with this work.

Experiments had shown that when uranium is bombarded by neutrons it breaks up into various fragments. Meitner and Frisch called this process FISSION and concluded that when uranium captures a neutron, the atom splits into two nuclei of roughly equal size. In 1939 Bohr and Wheeler predicted that the fission of the uranium atom was due to slow-neutron capture in the U235 atom.

Many investigators noted that uranium fission resulted in the emission of more than one neutron. The process could thus be self-sustaining. Each fission event was also accompanied by the release of a large amount of energy. Military applications became apparent. Further work was thus carried out in secret.

In 1941 Fermi constructed a graphite-uranium block for the study of neutron multiplication. Work progressed and in 1942 Fermi designed an apparatus for achieving a self-sustaining reaction. The device was called a "pile" and consisted of graphite-uranium oxide blocks. The first self-sustaining reaction was achieved on this pile on December 2, 1942.

FISSION

The fission process forms the basis of reactor operation. Thus as long as fuel is available* the reaction can be made self-sustaining.

The capture of a slow (thermal) neutron, n^{th}, by a U235 nucleus can lead to two events:

(i) $n^{th} + U235 \rightarrow U236$

This is a non-fission type capture and occurs about 15% of the time.

(ii) The fission type capture is shown in Fig. 1 and occurs about 85% of the time. Here the capture of a thermal neutron (thermal refers to the neutrons speed) leads to the production of two fission fragments of roughly equal mass.

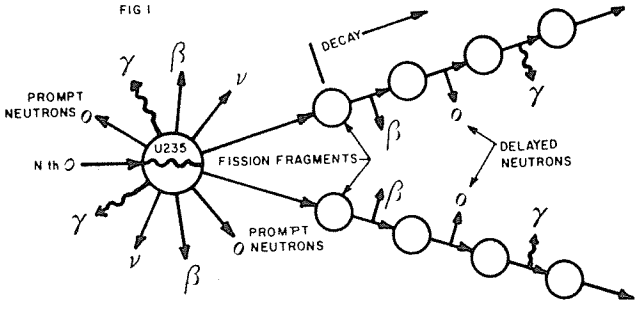


Fig. 1 U235 FISSION DUE TO CAPTURE OF A THERMAL NEUTRON

The two fission fragments carry off most of the kinetic energy given up in the process. Gamma (γ) rays, beta (β) particles, and neutrons (γ) are emitted at the time of fission and are referred to as prompt beta and gamma - 9 MeV/fission and 7 MeV/fission respectively.

The prompt neutrons are those which are emitted during or slightly after fission and account for approximately 99% of neutrons produced by fission. Prompt neutrons have an energy in the range of 0 - 17 MeV (average energy 2 MeV). Neutrons released over a period of minutes are known as delayed neutrons and include those neutrons which are emitted at times greater than 10^{-3} seconds after the atom splits.

The decay phase of the fission process is accompanied also by beta and gamma energies released by fission fragments seeking stable status. The total energy released per single fission process is approximately 200 MeV/atom (2). Fission fragments carry off 165 MeV. The military potential of the U235 fission process thus becomes immediately obvious. A small amount of uranium would contain many atoms and hence release great amounts of energy. The total energy released per gram of fissioned U235 is 1.96×10^{10} calories. It is interesting to compare this energy with the equivalent amount of TNT. A ton of high explosive TNT would release 9.1×10^{8} calories of energy. One gram portion of fissioned U235 would be equivalent to approximately 21 tons of TNT.

The military potential is demonstrated in the atomic bomb in which a large amount of uranium fissions in microseconds producing a tremendous blast. Other possible military uses are the products, isotopic and power, which accompany a controlled form of fission device, the nuclear reactor.

Fission also occurs via capture of slow neutrons in atoms other than U235. Fast neutrons and even gamma rays produce fission. U238 fissions under fast neutron capture. Most atoms however only fission and do not themselves sustain the reaction. Three atoms can be made to be self-sustaining - U235, U233, Pu239 - and as such are the only ones of reaction interest.

THE NUCLEAR REACTOR

A reactor can be simply defined as a system in which a chain reaction can be safely contained in a controlled manner.

The fission event produces neutrons. If at least one neutron per single fission event produces another fission event, then sustained chain reaction is possible. However, methods must be employed to prevent an excessive release of energy - reactor run-away.

The complex design of the reactor takes into account both the sustaining of the chain reaction and control of excessive reactor power.

1. Reactor Components

   a. Core. The core is central to the reactor in that it contains the fissionable neutron emitting fuel. In most reactors it contains also the neutron "thermalizer".

   b. Moderator. The moderator "thermalizes" or slows down the neutrons but does not absorb them. Light elements (water, D_2O - heavy water, beryllium, graphite - carbon) are preferred as the neutron loses a greater fraction of its energy in each elastic collision with these light elements than it does with heavy elements.

   c. Coolant. Fission fragments lose their kinetic energy as they

travel through the core. This energy generally appears in the form of heat. The coolant flows through the core to remove this heat. Both liquid and gaseous fluids of no or low neutron absorbing ability can be successfully used as coolants. Cooling is necessary if the reactor operating power exceeds 1 Watt.

d. Reflector. The reflector surrounds the core and prevents excessive leakage of neutrons from the reactor system. Reflector material must scatter and not absorb neutrons and such materials which are good moderators eg beryllium or graphite they can also be employed as reflectors. The reflector scatters or reflects neutrons from the core back into the core.

e. Control System. The control system consists of neutron absorbing substance(s) and can be used to regulate the fission rate. The control system is used to start the reactor, ensure its safe continuous operation, and allow shut-down.

f. Shield. Intense radiation is emitted both during and after the fission process. Neutron and gamma are the main radiation components. The shield absorbs this radiation thus preventing its leakage to the reactor environment.

2. Critical Mass

The chain reaction in a reactor can be maintained only if sufficient number of neutrons resulting from the fission are conserved. U235 fission produces on the average 2.54 neutrons. However, not all of the 2.54 neutrons undergo thermal capture in a U235 nucleus. Their fate is complex. The neutron may escape, be scattered, or absorbed in the core by substances other than U235. Reactor or neutron flux density and/or substance cross-section (measure of probability that a neutron will be captured or absorbed) influence the neutron loss. Sufficient fissionable material, ie neutrons, must be present in the reactor core to make good this loss. It is this minimum quantity of fissionable material that is known as CRITICAL MASS. For uranium 235, the critical mass varies from 300 to 650 grams depending upon the reactor system used.

The factors affecting critical mass can be illustrated as follows:

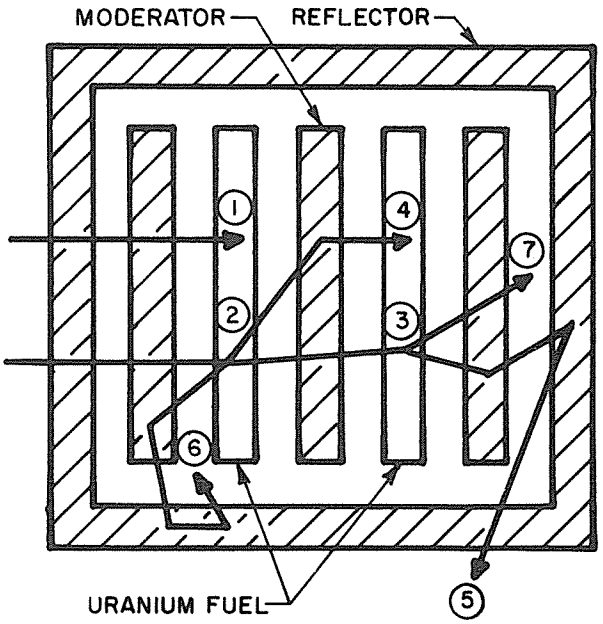


Fig. 2 NUCLEAR ASSEMBLY FOR THERMAL FISSION

Fig. 2 represents a simplified picture of a reactor containing uranium fuel, moderator and reflector. The use of a moderator (converts fast neutrons released in fission to slow or thermal neutrons which are more successfully captured) implies a thermal fission device. U238 is not fissioned by slow neutrons and as such the fuel must contain U235. The assembly can be either enriched U235 fuelled or natural uranium fuelled (natural uranium contains 0.712% U235).

The fate of a thermal neutron when captured by a U235 nucleus has been discussed. Briefly these are as follows:

a. non-fission capture resulting in U236 - no release of neutrons (1).
b. U235 fission capture resulting in two to three fast neutrons (2).
c. U238 fission capture (neutron energy must be greater than 1 MeV) also results in the release of more neutrons (3).
d. reasonance capture in U238 produces plutonium but does not form neutrons (4).
e. although the neutron may collide with uranium moderator and reflector atoms, be slowed down, and change direction, it can still escape (5).
f. the neutron may be slowed down, reflected back to the fuel but once again be exposed to the above process (6).
g. neutron absorption by reactor poisons (impurities which absorb neutrons but do not fission) also accounts for neutron loss (7).

Thus if the following neutron balance is maintained

neutron gain = neutron loss

Process ② + ③ = Process ① + ④ + ⑤ + ⑥ + ⑦

the chain reaction can be sustained.

Critical mass is thus a function of fuel type and purity, neutron energy used for fission, choice of moderator and reflector, and positioning of moderator and reflector. The addition of a coolant and control system would further affect the critical mass.

The design of a reactor can thus be seen to be a complex project in which neutron balance must be maintained at all times. There are however sub-critical and super-critical as well as critical assemblies. These assemblies operate either below or above the size of the critical mass.

3. Reactor Control

The control of a reactor is achieved by varying the neutron population in the core. Several factors influence reactor control. These are not only mechanical systems (control rods) but also certain processes and design features.

The temperature effect and void effect are two of the process/design features which control reactor output. Core temperature is directly related to reactor output, ie, as the power increases the core temperature increases. Increases in core temperature result in:

a. decrease in reactor reactivity due to neutron energization. That is to say, as temperature increases the energy of the thermal neutron increases. Any increase in the energy of the thermal neutron will reduce its likelihood of capture by a U235 nucleus.

b. decrease in reactivity due to moderator expansion. As the temperature in the core increases the density of the moderator decreases. Thus reducing moderator "slowing-down" efficiency.

c. if the reactor is water moderated an increase in temperature will not only decrease its density but will also lead to bubble formation (voids) - decreasing reactivity.

Increases in reactor reactivity are also countered by the above control/design features. Increases in reactivity mean increases in temperature.

Nuclear reactors, because of fuel burn-up, must be loaded with more fissionable material than that which is necessary to sustain a chain reaction. As such, reactors have a built-in excess reactivity. Another method to reduce excess reactivity and maintain a neutron balance is to employ a neutron absorber. Both the fuel and absorber "burn-up" during reactor operation - the balance is thus somewhat maintained.

NOTE: Burn-up of reactor components such as fuel does not imply an actual fire. The term is used to signify component depletion.

Reactor poisons, ie, fission fragments which absorb but do not fission, are also a drain on neutrons. The major poisons are Xe135 and Sm149. Xe135 is formed by both fission and Te135 decay (Te135 is an unstable isotope which in its attempt to reach stability forms Xe135).

The effect of Xe135 as a neutron absorber must be taken into account when designing a nuclear reactor. Although during reactor steady state operation Xe135 concentration reaches an equilibrium value (a function of core flux density), the shut-down and subsequent start-up can pose a problem if the reactivity of the system is too low. That is, the concentration of Xe135, due to Te135 decay, reaches a peak 11 hours after shut-down. If the built-in reactivity of the system is not great enough to overcome the neutron absorbing effect of Xe135, reactor start-up will prove difficult shortly after shut-down.

In many reactor systems the control system generally refers to the mechanical systems. For thermal reactors the neutron population is controlled by movable rods containing neutron absorbing elements such as Cadmium, Boron, and Hafnium. For fast reactors control of neutron population can be affected by the use of any or all of the following:

a. control rods.

b. movable fuel rods,

c. movable reflector.

The type of control rod is a function of its duty. Control rods can be categorized in three ways:

a. shim rods which are used for coarse control and bringing the reactor up to the desired power level.

b. regulating rods which are used as a fine control to keep the reactor at a desired power level.

c. safety rods which are used for quick reactor shut-down.

Immediate or quick shut-down is defined as SCRAM. Quick scrams ie, emergency systems, are an integral part of reactor design. Emergency shut-down can be achieved in the following ways:

a. quick dumping of moderator from reactor.

b. gas purging to introduce VOIDS into the system.

c. introduction of poisons into the system.

4. Materials of Construction

These can be broken down into two groups - core components and components outside the core. Materials of construction for the core must meet many and varied requirements making their selection difficult. These requirements are:

a. low neutron absorption cross-section,

b. good high temperature properties,

c. good heat transfer properties - preventing expansion and buckling of material.

Selection of material of construction for components outside the core is not as stringent as that for core components. However, the design of a reactor is an all encompassing task requiring careful consideration of all components. A complete description of reactor materials is beyond the scope of this article.

5. Fuel Burn-up

Reactor power level can be equated with fission energy to determine the amount of fuel depleted per unit of power. Reactor power is expressed in terms of Watts (W).

6. Reactor Types

Reactors can be classified not only as to their purpose but also as to how they achieve that purpose. Generally a reactor serves the following purposes:

a. research reactors - pave the way for commercial applications of reactors by experimentation which results in a better understanding of radiation as applied to many radiation uses. Also provide reactor training for personnel.

b. breeder reactors - produce Pu239 or U233 from fast neutron capture and subsequent decay by U238 and Th232.

c. power reactors - convert fission energy to electrical power. See Fig. 3.

d. isotope production reactor - all the above reactors can be used in the production of radioisotopes.

e. propulsion reactors - supply thrust to orbital and interplanetary rockets.

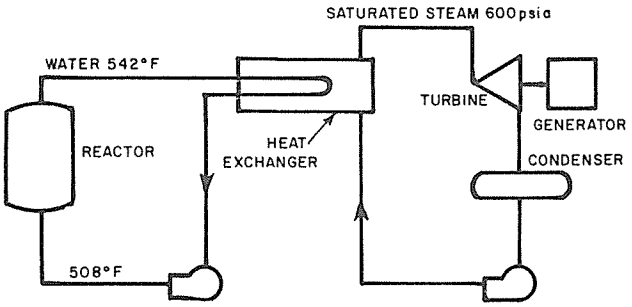


Fig. 3 THERMODYNAMIC CYCLES - PRESSURIZED WATER REACTOR

The method by which reactors achieve the above functions are many. That is, there are many variations in reactor design. The following are some reactor systems: water cooled and/or water moderated; gas cooled - graphite moderated; liquid metal fast breeder reactor (LMFBR); pressurized water reactor (PWR); boiling water reactor (BWR); steam generating heavy water reactor (SGHWR); etc.

7. Conclusions

The future of nuclear reactors lies mainly in the field of power production. Mill rates per kilowatt hour are fast becoming competitive with other forms of power production. Plans for Nuples, nuclear complexes, consisting of nuclear reactors which can produce steam and power for industry as well as vast quantities of desalinated water hold great promise and are being carefully examined in countries such as Israel, India, and Pakistan. These Nuplexes could be centered around saltwater areas and provide incentive for new industrial/agricultural and community growth.

Military applications of these reactors lie in both desalination of sea water and electrical/steam production in isolated areas. Small static and/or portable reactors have great potentials. The nature of the nuclear reactor is such as to employ mainly mechanical engi-

neers.

A possible REME function?

Finally, the state of reactor safety and know-how does no longer restrict reactor location to remote areas. Reactor run-away, in the most extreme circumstances, does not result in nuclear detonation. Reactors could be built in cities. Cities could be built around reactors.

Symbols

n^{th}	thermal or slow neutron
γ	gamma ray
β	Beta particle
ν	neutrino
U235	Uranium 235
U233	Uranium 233
TNT	TriNitroToluene
Pu239	Plutonium 239
Pu238	Plutonium 238
D_2O	Deuterium Oxide - heavy water
Xe135	Xe non 135
Sm149	Samarium 149
Tel 135	Tellurium 135
Th232	Thorium 232

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1. Nellestyn, A., Radioisotopes and Their Applications, RCEME Technical Bulletin, Vol. 12, No. 4, December, 1967.

2. Ellis, R.H., Nuclear Technology for Engineers, McGraw-Hill.

3. Benedict and Pigford, Nuclear Chemical Engineering, McGraw-Hill.

4. Schultz, Control of Nuclear Reactors and Power Plants, McGraw-Hill

NOTES

*Uranium fuel (natural uranium) consists of two isotopic forms of uranium, U235 and U238 - U235 being present to the extent of 0.712%.

AUTOMATION AND MIDDLE MANAGER

by

LIEUTENANT COLONEL ALD MACDONELL

INTRODUCTION

A large proportion of the management literature available today, dealing with the impact of automation, would lead us to believe that the days of middle management are numbered.[1] It is to this postulation that this paper is addressed.

"Automation" is defined in the Merriam-Webster Seventh New Collegiate Dictionary as:

> "1: the technique of making an apparatus, a process, or a system operated automatically 2: the state of being operated automatically 3: controlled operation of an apparatus, process, or system by mechanical or electronic devices that take the place of human organs of observation, effort and decision."

The spectrum of activities in an industrialized society encompassed by these definitions are too widespread to be examined in a paper of this length, accordingly our considerations will be delimited to that part of the definition, 3, which is germane to "operation of a (....) system by electronic devices that take the place of human organs of observation, effort and decision". This is, in effect, automation in the form of computer-aided management information systems.

Todays incumbents of most middle and virtually all senior management positions acquired their managerial experience and training in an era when, for all practical purposes, computers did not exist. It is just seventeen years since the first commercial digital computer was installed in the United States Bureau of the Census - and yet now there are over two thousand such installations in the U.S. Department of Defense. These computer installations support management in their control of an ever-widening diversity of military systems activities which can, in many cases, no longer be undertaken by manual information processing means and in other cases simply could never have been undertaken by human effort alone.

Superficially, the period since 1950 may seem to represent a time span of sufficient length to produce a new generation of junior and middle managers familiar to some degree with the advantages and limitations of this new management tool. This would possibly be the case if the development of computer-aided systems had evolved on a linear scale. Fortunately, or unfortunately - depending on your point of view, it has not. We are moving on an exponential curve which has created a so-called third generation[2] of computers having mass-memory capacity and accessibility far beyond the conception of all but the science-fiction writer of only five years ago. Not only have these computer systems been designed but they are in mass production. It is the current and imminent delivery of these systems which have the ability to accept, store, manipulate and output masses of data in the format of information useable by management that has led to the coining of the term "information explosion".

It is this information explosion that is going to have a major impact upon management at all levels.

Automation in the U.S. Department of Defense

The Department of Defense (DOD) is in the vanguard of those organizations which have recognized the potential of the computer as a management-supporting device. As the largest single user of computers in the world, it would therefore seem appropriate to commence our examination of the impact of automation upon middle management in the military environment. Before doing so, however, it will be necessary to define what we mean by the term "middle management" in a military sense. To this writer's knowledge, no formal definition exists--arbitrarily,

therefore, we will select the ranks of major to brigadier general inclusive (and their naval equivalents) as representing this management level.

The first military application of computers that made appropriate use of their capacity is found in the North American Air Defense System (NORAD), where computers are interlinked in a communications network which provides operational information required for the effective management of an air defense weapons system. Representative of a few of the other operations-oriented or "command and control" systems in being or scheduled for implementation are the following, listed with a brief description of their objectives:

> World Wide Military Command System (WWMCS) - for strategic control of U.S. Forces around the world.
>
> U.S. Army Tactical Fire Control System (TACFIRE) - for control of (short range) surface to surface weapons.
>
> Naval Tactical Data System (NTDS) - for tactical control and development of naval task forces.
>
> Marine Corps Tactical Data System (MTDS) - for control of close air support.

It is possible, at this point, that some readers will take exception to the introduction of automated systems designed to support military operations as not being representative of management in the normally accepted sense. To counter this possibility it is suggested that one so inclined consider the purpose of any "business" (be it industrial, commercial or military) - it is, of course, to achieve the objectives appropriate to its activity. This could be "profitability" from its product, its services or its security in the "business" classifications selected above. What then, of the possible objections to the term "management" under these circumstances. There are many who insist that a military officer does not "manage" - he "commands". To resolve this contention, let us consider Henri Fayol's widely accepted conception of the job of managing, as consisting of several distinct functions or processes: planning, organizing, commanding, co-ordinating and controlling. Of these functions, it will be noted that the descriptions of the military operations systems listed above each specifically contain the control function, with all of the others implied.

Continuing then with our analogy of the military "business" with "security" as the product, it is of prime concern to the operations or "line" manager to see that this objective is met. To achieve this aim, he must have the support and assistance of "staff" managers in a multitude of supporting activities, each of which have already been influenced to varying degrees by the adoption of automation in support of their functions.

An overview of military support and staff functions immediately brings us into the realm of activities more readily recognizable to the world of business and industry. In each of the military services we find conventional computer or automatic data processing (ADP) applications in the following representative areas:

> Pay
> Personnel
> Financial Management
> Logistics - supply
> - maintenance
> - transportation
> Intelligence (information retrieval)
> Cataloguing
> Simulation
> Research and Development
> Education/Training

At the highest levels in DOD, the Planning-Programming-Budgeting System could never have been instituted in its present configuration without the computer, nor could the Readiness Reporting and other command and control systems of the Unified and Specified Commands. Within each of the services we see an ever-lengthening chain of essential applications, each securely welded to computer processing of the data within those systems. Initially, many of these appli-

cations were small, and most operated in parallel with their preceding manual systems on the premise that if things "did not work out", reversion to the manual systems was feasible. In practically every case, that possibility has gone. The time and manpower requirements to revert to the old manual systems preclude any such regression, even if it were desirable.

Having established that, like the horseless carriage, automation is here to stay - at least in the DOD; what are the obvious or apparent effects upon the middle military manager? In the realm of the line manager, examination of the tables of organization or establishment charts of the pre-automation period of World War II and the Korean War would reveal that there has been no reduction in the numbers of "middle managers". The war rooms, artillery command posts, combat information centers and tactical air headquarters now contain as many and more officers than they did fifteen years ago. The difference is that they are, with the aid of computers, dealing with greater volumes of data which is more timely and useable to assist in making or recommending right management or "command" decisions.

Automation in the Department of National Defence

The relatively small size of the Canadian Armed Forces would appear to make automation a less profitable venture for their management information system requirements. In the Canadian situation, however, other factors have created an ideal climate for the early introduction of the total systems concept, made possible by the creation of third generation computers. The two major factors which differ from the U.S. military conditions are: (1) the integration of the management systems of the Royal Canadian Navy, the Canadian Army and the Royal Canadian Air Force into the single unified management system of the Canadian Armed Forces, and (2) the fact that few automated systems "poured in concrete" existed under the old methods of single service management.

What effect, then, has automation on middle managers in this environment? In terms of numbers, it is too early to say. The unified systems are not sufficiently developed to do more than theorize in this regard. There have been, or are pending, significant reductions in the numbers of people at the working level in specific support activities, such as pay and personnel, but the ranks of middle management are virtually unchanged.[5] What has changed, is what middle management is doing. This in turn has pointed out a gross deficiency in the level of knowledge and ability of those middle managers with regard to being aware of what automation can do for them and what they must do for it.

Automation in Commerce and Industry

The foregoing problem of the Canadian Armed Forces is not restricted to the military environment. It is practically impossible today to pick up a reputable periodical which does not contain some reference to the impact of automation on our society. Unfortunately, many of these articles suffer from a shortcoming which is widespread in our press and not unique to automation - they give the reader the false impression that we have implemented this, that, or the other advanced computer system "now", whereas in fact its' full or effective operation may be months or years ahead.

The facts concerning automation are further clouded by the proliferation of so-called automation experts who, because of uninformed managements' "black box" view of computers, are able to mislead system evolution --- in the worst cases, to their own ends.

Notwithstanding the misrepresentation of, and hazards involved in, any major revision of systems and procedures, the inescapable fact is that automation will exert an ever-increasing influence on management techniques and organization. In a recent yearlong survey by Booz, Allen and Hamilton, summarized in the Harvard Business Review of Sep - Oct 1966, the 33 major manufacturing companies studied were found to have extensive involvement in the automation of most of those areas already enumerated in our military applications, plus the additional categories of marketing and factory oper-

ations. It was further reported and emphasized that all of these firms were working towards systems integration. Similar reports are available from a multitude of responsible and reputable sources.

Most of the individuals directly involved in automation have come from two sources: (1) those who have come up through the ranks of highly specialized applications which evolved on punched card equipment and (2) computer manufacturer trainees who are largely equipment, rather than system, oriented. Supplementing these sources, we only recently have added university graduates who have specialized in computer sciences. Of these sources, the first two are unlikely to produce many "generalist" managers, while the latter has not been on the scene long enough to enable those so qualified to acquire the balanced mixture of management principles and practice required to be effective in that role.

Conclusions

All of the evidence available indicates that the information explosion resultant from the increased capabilities of computers will lead to a cycle of growing dependence upon automation in support of management. It is also apparent that associated implementation of the total systems[4] concept will enable a degree of centralization, never before possible, to take place.

If the middle military manager of today is to survive under these circumstances, he must take immediate steps to defer his obsolescence by attaining at least an appreciation level of knowledge of the computer. He will require this knowledge to influence those who are directly concerned with the detailed design of the automated systems which will surround him. If he does not so participate, he may well find himself designed right out of the system.

His role and responsibilities may change but there is, and always will be, a place for the middle manager. It is up to him to see that the computer serves as a tool for his use as well as for the use of senior management. It is one thing for senior management to be aware of all computer-provided exceptions or deviations from established standards, but it is another to devise ways and means of rectifying those variations. It is physically impossible and impractical for senior management to act upon or concern themselves with decision-making associated with all degrees of detail, nor can the lesser details always be delegated to the computer programmer. The average programmer simply does not have the management experience and judgement required to cater to every combination of real-life circumstances that arise-particularly where human factors are involved.

In the words of Dr. Alain C. Enthoven, "The point is to render unto computers the things that are computers' and to judgement the things that are judgements'".

EXPLANATORY FOOTNOTES

[1] An article typical of this line of thought was written by Gilbert Burck in 1964 which makes reference to a work by Thomas Whisler and Harold J. Leavitt, published in the Harvard Business Review in 1959. Although some of their prognostications are still valid, the reader is cautioned against their acceptance in toto because of the generally unforseen spectacular advances in computer technology during the past three years.

[2] The term third generation generally applies to those computers having mass memory capacity with a direct or random access capability. Typical of these are I.B.M.'s System 360 Series.

[4] The "total systems" concept proposes the sharing and exchange of data common to two or more information sub-systems or between a sub-system and a central system. This involves standardization of data elements, codes and computer languages-in other words, "integration" of all the systems in order that they may communicate directly with each other for the common good.

5 The pay system of the Canadian Armed Forces is now mid-way to becoming an integrated system. The Army accounts have been processed in this mode since 1 September 1967, the Air Force since 1 January 1968 and the Navy were scheduled to go on 1 April 1968. In mid 1968, the automated personnel system will be gradually absorbed in the same "building block" manner ---- all on one computer network. This is typical of the manner in which a "total system" can be implemented. To date, all personnel reductions due to automation have been at the clerical level. Reductions in middle management were from Forces unification, which preceded the integration of such automated systems as formerly existed in each service.

END

CENTURION TANK REPAIR

AND OVERHAUL PROGRAMME AT 202 WORKSHOP DEPOT
BY CAPTAIN JGHL ROY: CHIEF WARRANT OFFICER KA LEE: AND MR G RANDALL

The Centurion Tank (manufactured in the UK) entered service in the Canadian Army in 1952. The repair and overhaul as now constituted in 202 Workshop Depot was commenced approximately ten years ago. Prior to this period, some repairs, modifications and relubrication to Canadian Standard was carried out.

The development of the present system of repair and overhaul has been evolved over the years. The system continually requires adjustments due to minor or major modifications, age and usage, reclamation of items in short supply and improved work methods and tooling.

The complete Centurion tank including all its components and assemblies (mechanical, electrical, electronic and optical) are overhauled at 202 Workshop Depot and brought as near as possible to the original standard. In addition, certain components and assemblies which are replaced elsewhere in the maintenance system are shipped to 202 Workshop Depot for repair. These items are overhauled concurrently with the complete tank overhaul programme.

A peculiarity of the tank is that a considerable number of components are mated either to a particular hull, a particular turret and/or in another assembly, and, therefore, must be specially tagged and overhauled as a group. Of course, the majority of components and assemblies are interchangeable between any tank.

Centurion tanks are reconditioned using the "Gang System", that is, tank movement is minimized with repair groups moving to the job. The main repair line employs four crews of two men each. Crews are divided into two internal and two external repair gangs. Supporting groups consist of two electricians, two body repairmen, two painters, one textile repairman, one welder and five weapons technicians. In addition, the main workshop sub-sections repair components and assemblies in support of the programme.

For readers not familiar with the plant layout of 202 Workshop Depot, it is pointed out that the tank rebuild line is located some distance from the main workshop. Since the workshop is not under one roof, production planning and control, scheduling, routing, etc, take on a much greater significance.

The current production rate is two tanks per month. In order to maintain this rate there is a requirement for nine tanks in progress at all times, plus a backlog of non-serviceable tanks available in 25 COD. The nine tanks consist of seven in bays on the main rebuild line, (Photo 1) one progressing through final inspection and one in paint and preservation.

Each tank requires approximately ten weeks from start to finish. The first operation on receipt of the tank in the repair bay is removal and stripping of the turret.

On removal it is forwarded to the armament bay. The barrel is cleaned, measured and replaced if necessary. The turret is stripped and reconditioned to current specifications. Stage and final inspections are carried out in conjunction with repairs. Each turret is repaired and made ready for installation on completion of hull rebuild.

After turret removal, the hull is available to stripping crews. All stowage bins, skirting plates, etc. are removed and forwarded to the body repair section for reconditioning. Electrical components and wiring harnesses are removed, tested and repaired as necessary. The suspension and running gear are completely stripped from the hull and forwarded to the applicable sub-section for repairs.

Items replaced 100% are cleaned and returned to Spare Parts Stores Group. The current policy is to replace the major assemblies 100%. Assemblies in this category are Meteor engines, Morris engines, gearboxes, final drives, clutches, dynamotor and some instrumentation. The assemblies are rebuilt on separate repair programmes to the tank rebuild programme. All engines are completely reconditioned and dynamometer tested. Gearboxes and final drives are reconditioned and thoroughly tested on test stands simulating functional operations. Clutches are reconditioned and set up in jigs. All reconditioning of these assemblies includes stage and final inspection under the very critical eye of our Inspection Department.

It must be appreciated that a great deal of co-operation and co-ordination is required by all sections in order to feed the main overhaul programme. The complexity of the repair processes are great when it is realized that such items as the road wheel brackets must be returned to original specifications. This involves alignment, build up by welding of worn bottom ends, line bore and installation of seat adapters for pin holes, truing of surfaces and pressure testing for leaks. Shock links, which are, no doubt, a problem to all units and in short supply, must be repaired by the workshop. These and many other components of a complex nature are mentioned to point out that the workshop responsibility is to repair and overhaul and to do so as economically as possible.

On completion of stripping, the hull is forwarded to the cleaning bays in one of the few moves the main item makes during processing (Photo 2) it is scraped and steam cleaned. All necessary welding e.g. steering lever interlocks, are completed. The hull is primed externally with red oxide and painted internally with aluminum paint. It is then returned to its repair bay. All stud holes are inspected and tapped as necessary. During the cleaning process, arrangements for parts and material, for the re-installation programme are progressed. The hull being basically an open box, items that have been removed last, are, as a general rule, installed, first. The rebuild period for the hull is approximately eighteen days. On completion of the hull rebuild, armament and electrical crews install the Turret (Photo 3). The tank is then taken on a five mile run by the crew. Although stage inspections are carried out in conjunction with repairs, the tanks are now turned over to the Inspection Department. A complete functional inspection is carried out, but it cannot be considered a shakedown trial due to the limitation of terrain.

On completion of final inspection and correction of rejects, the tank is forwarded to the main paint section of the workshop. The tank radio harness is then installed, paint, preservation suitable for local conditions is applied, skirting plates are installed and the tank is returned to 25 COD in serviceable condition. Prior to being issued from 25 COD, all tanks are once again given a cursory inspection to ensure that the product issued is fully serviceable. Batteries are installed and the tank is moved to a flatcar. Battery cables are removed, clutches locked out and the tank shipped when 25 COD have completed their kitting responsibility.

END

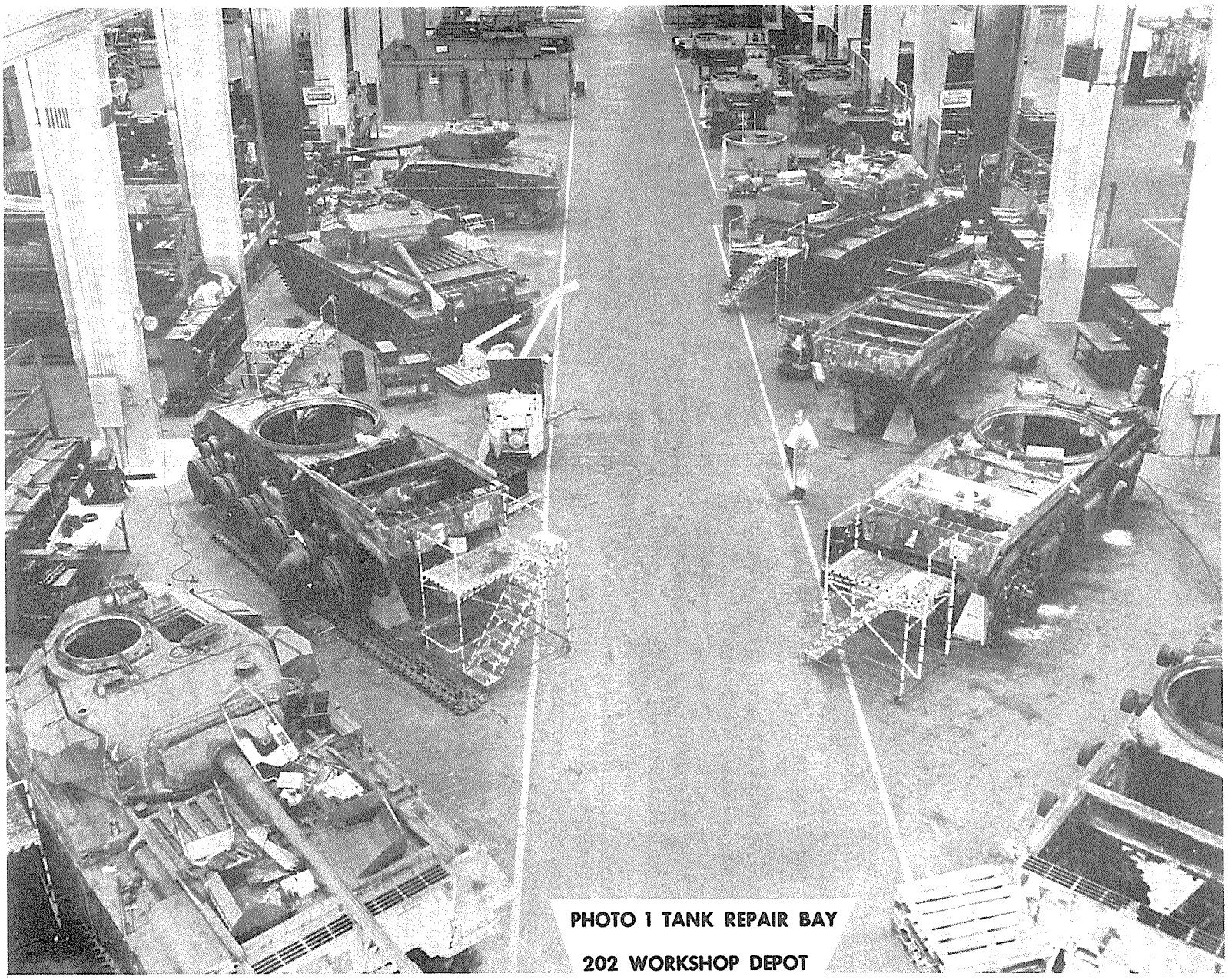


PHOTO 1 TANK REPAIR BAY

202 WORKSHOP DEPOT

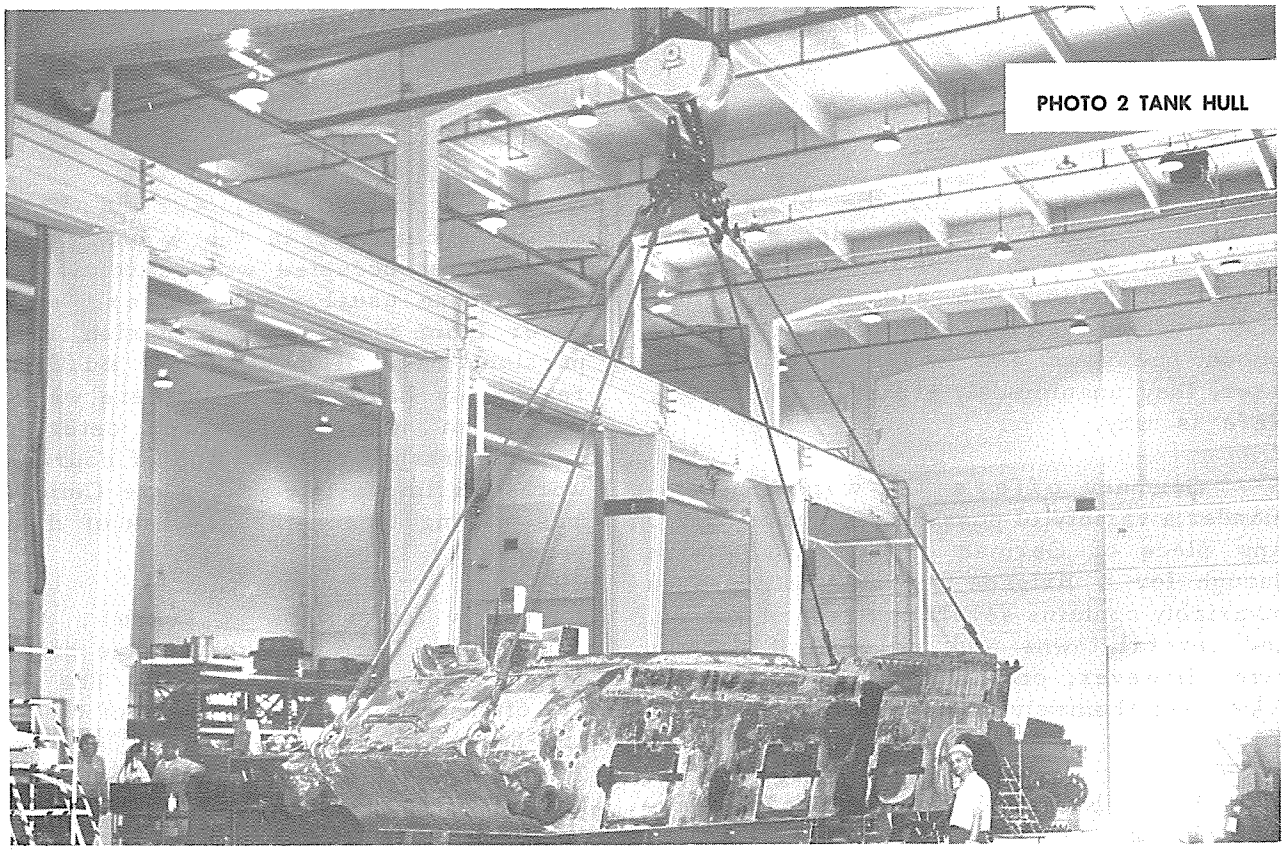


PHOTO 2 TANK HULL

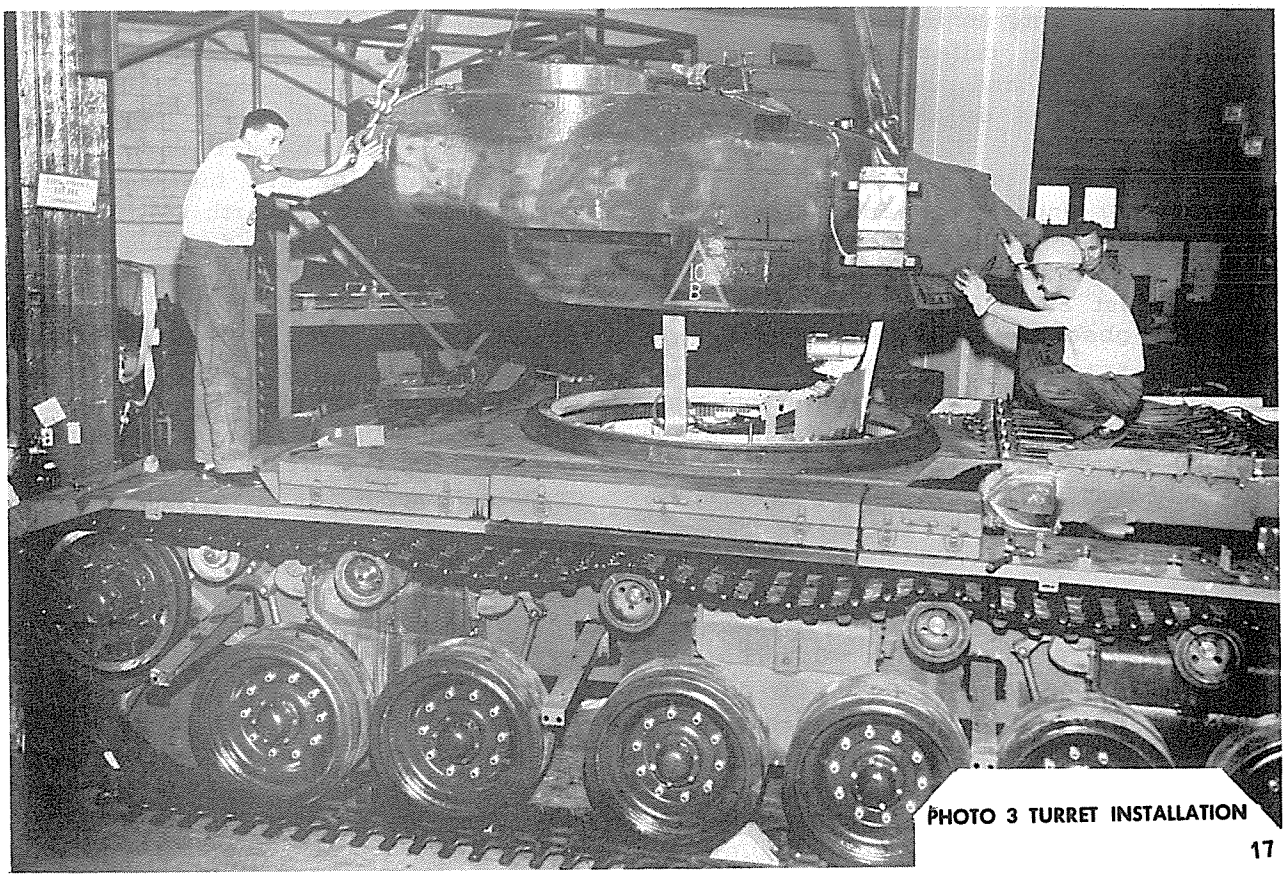


PHOTO 3 TURRET INSTALLATION

VILLAGE DEPLOYMENT IN GERMANY

by

CAPTAIN JI HANSON

The woods are for the birds! This is the opinion of those discerning souls who were with 4 Field Workshop for Exercise CHECKMATE in 1966 and Exercise ROB ROY in 1967. Having sampled life in the woods one year and in the towns a year later, they unanimously preferred the latter. Here is why.

Germany offers the workshop commander a variety of possible workshop sites. Any piece of German real estate large enough for a Brigade Administrative area invariably contains several patches of forest, and several towns and villages of various size. However, only a few locations in the BAA lend themselves to workshop requirements.

First, let's deal with the woods. Anyone who has served with a field unit in Canada is very familiar with the disadvantages of setting up in the bush. German forests are quite different from those in Canada however, and some of these Canadian disadvantages do not apply to them.

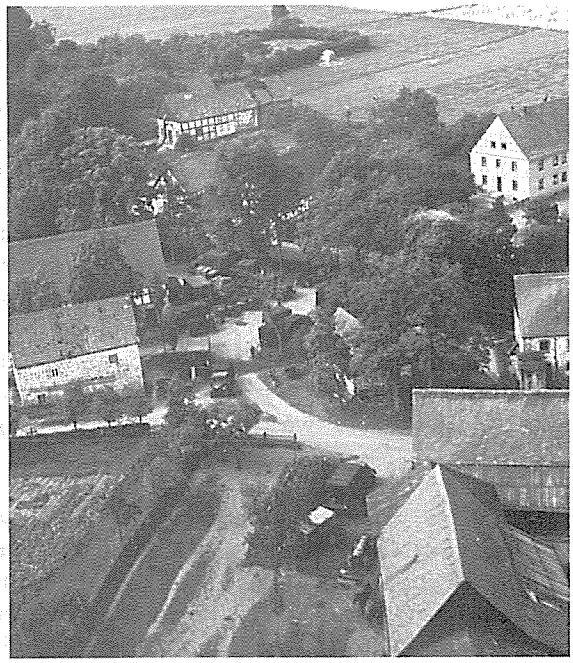
The forests of Germany are remarkably free of underbrush and also free of biting insects. The forest can offer good high cover, and in select areas vehicles in the forest camouflage can be invisible from air observation. The trees are frequently spaced far enough apart to permit ease of vehicle movement without cutting, which is forbidden. The main disadvantages to woods lie in their location. They are frequently planted on steep hills, which makes movement and siting of individual trucks a bit tricky. When sited on level ground, the forest floor can quite often be marshy. On balance however, German woods are better for workshop sites than those in Canada.

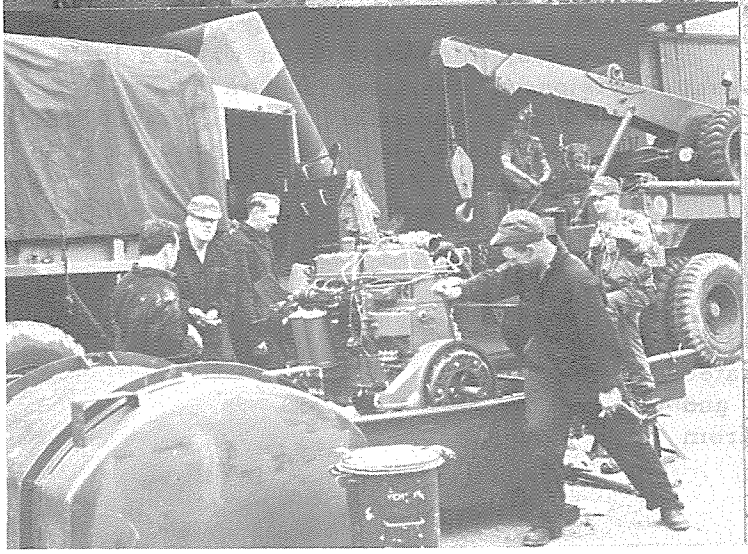
Exercise CHECKMATE was the Second British Division's autumn field training exercise in 1966. The complete Canadian Brigade participated as the enemy force. During the course of the scheme, 4 Field Workshop set up exclusively in the woods. The different sites occupied were carefully selected for the usual advantages: excellent cover from view, good provision for dispersion, ease of defense and sufficient reasonably hard standing. There was some problem with forest roads deteriorating under workshop traffic, and of course night work was impossible unless the Commander was willing to accept the risk of detection because of lights.

Now for a look at towns. German towns, like German forests, are quite different from those in Canada. The houses are often set right on the edge of the roads, and nearly all roads are paved or cobbled. The barns are invariably huge places, capable of holding several vehicles apiece when empty of agricultural impedimenta. Gasthofs abound, and there are always several magnificently endowed frauleins around to brighten up the social scene. The village burgomeister, or mayor, has considerably more power and respect than his Canadian counterpart, and any request of his is usually complied with by his townsfolk. Thus he is always a person worth cultivating by any workshop commander desiring his village as a workshop site.

Exercise ROB ROY was the Fourth British Division's autumn exercise in 1967. Again, the complete Canadian Brigade acted as the enemy force, supported technically, as usual, by that keen, razor-sharp fighting organization, 4 Field Workshop.

During ROB ROY, 4 Field Workshop set up four times; three times in villages, and once (for a period of one hour after which an unexpected crash move was ordered) in the woods. Experiences in ROB ROY were quite different from those of CHECKMATE because of this. The experiences the workshop had in village living are set out below.





First, not every village is suitable for a workshop site. If the village is too large, it generally has recently built-up fringes and offers insufficient large courtyards, barns and parking spaces for the workshop's hundred and thirty odd trucks. On the other hand the small village, composed usually of a number of farm buildings clumped together with barns, courtyards, shops, homes etc is often too small to house the whole workshop comfortably. A compromise can be found by siting the unit in two such small adjacent villages, and in fact this was done twice during ROB ROY.

The villagers everywhere proved to be almost all friendly. Each platoon fortunately had at least one "Duetscher Schprecker" who maintained liaison in each platoon location, and relations varied from amicable to downright intimate. The only place the local citizenry drew the line was in the occupation of barns--they didn't want army trucks in them. In wartime this would prove no problem of course--agricultural pursuits would be secondary and the barns would be taken over. On exercise however, good relations take precedence over tactical considerations, so vehicles were parked in courtyards close to buildings, and under eaves where possible. This aided camouflage, and provided excellent working areas-the paved courtyards-right beside the trucks. In many cases the soldiers were permitted to sleep in barns, and two enterprising souls on one occasion quietly rented rooms in a local gasthof for a few nights.

The villages occupied offered several other advantages over woods. Every one had numerous paved roads which provided a ready-made track plan. Village street lights masked working lights, making round-the-clock repair operations feasible. Village noises masked generator sounds, whose characteristic clatter advertises a workshop far and wide in the woods. The varied pattern of barns and courtyards dictated dispersion which added to concealment and would theoretically minimize damage from air or artillery attacks.

Dispersion is a two-edged sword, however. Not only do the troops have to walk farther for their meals, but defense against ground and partisan attack is not as simple as in the woods. Interplatoon communication becomes more difficult when radios are not available (as in the case in 4 Field Workshop). To overcome some of these security problems, standing patrols, costly in manpower, had to be set up nightly in the villages in addition to the usual perimeter sentry posts.

For field feeding arrangements villages are excellent. There is usually an abundant supply of fresh water available for cooking. Kitchen areas are easier to keep clean. Kitchen swill can be traded for eggs, vegetables and other items useful in supplementing British rations with which the unit is supplied on exercise. Candies and chocolate bars from the ration packs can also be bartered in this manner. Workshop cooks have been known to trade cans of steak-and-kidney "pud", "M and V", and shepherd's pie for fresh meat. Their genius knows no bounds.

The average soldier finds village life wonderful. He sleeps, generally, under a real roof, and frequently can wash, shave and eat under cover too. His working area is reasonably clean and free from obstructions. Attractive girls wander by from time to time to provide a pleasant diversion. After work he can repair to the nearest gasthof for a few cool beers, shoot the breeze in comfortable surroundings with his buddies, and maybe even watch a little television or play the pinball or Roto-min machine. The bakeries supplement his diet at low cost. And, if he happens to be young, single, and a smooth talker, there's no telling what or who he might talk himself into. The woods were never like this!

LAND MATERIEL MAINTENANCE PUBLICATIONS

By

MAJOR P BATESON

One of the more obvious legacies of unification is the need to amend or rewrite many of our training pamphlets. Little has been done in the past four or five years to keep these up to date. In addition to this lag, new establishments have been evolved, new equipments introduced, and presumably new tactics and doctrines approved. The existing training pamphlets are, therefore, out of date and in some cases incorrect and downright misleading.

To solve this problem, HQ Mobile Command has organized a department, whose prime responsibility is the writing and amending of training manuals affecting the field army. Included in this department's programme will be those manuals, or portions thereof dealing with **LAND MATERIEL MAINTENANCE** known in the past as RCEME.

The requirement for training pamphlets falls into two general categories. First, we have pamphlets for strictly maintenance units and activities. These pamphlets deal with Field Workshop, or whatever organization replaces it, and such activities as recovery. Most other activities are covered by trade study manuals, EME manuals etc, and are not part of this dissertation.

At present CAMT 11-3 Operation of a RCEME Field Unit deals quite well with the Field Workshop. There are a number of areas that should be amended. My chief criticism of this pamphlet would be that too much is based on the operation of a static unit e.g., the Commanding officer's records etc., as described, are not portable. Also the battle drills are not suited to a fast moving mobile war, and defence, particularly deception, communication and offensive patrolling are not dealt with in sufficient detail. I have dealt with these matters more fully in a previous article. [see note 1]

Note 1:

The Practical Operation Of A RCEME Field Unit by Major P Bateson, RCEME Technical Bulletin Volume 11, Number 4, Oct 1966 page 1,2,3,4.

Other obvious amendments of course are now required to match the new establishments and the changes due to the introduction of the Service Battalion.

Recovery is amply dealt with in CAMT 11-4 Recovery Technique. Again changes in establishments demand that this pamphlet be up dated. However, like CAMT 11-3 the basic pamphlet is good and in most instances still applicable.

The introduction of Maintenance Platoons and Troops has placed a fairly large number of maintainers in every major combat unit. These platoons and troops have, during the past few years, developed methods of operating which should now be codified for the elucidation of future platoon commanders, and men. There is also a requirement that the school be kept up to date in this area, so that their teachings will bear some relations to actual practice. Last but not least, maintainers employed in other commands must have some means of updating themselves in maintenance operations in the field army.

There are two schools of thought as to how these aims can be best achieved. One school argues that since the maintenance platoon is an intregal part of the unit it services, organizational and doctrinal information should be part of the parent unit's training pamphlet. The other claims that the operation of maintenance platoons and troops are specialized and of such importance, that they require a pamphlet of their own.

Let us look at an extant if moribund example of the former. CAMT 3-1 The Armoured Regiment in Battle has 303 pages of which 3½ deal with the LAD (now) Maintenance Troop. This happens to be the largest of all the maintenance troops in the Brigade Group. These 3½ pages deal with Command, Role of the LAD, Classification of Equipment Casualties, Communications and Employment of the LAD in Offence and Defence.

If we agree that this sketchy information is sufficient, then no more need be said. If not, the alternative is a separate pamphlet for the maintenance platoon. To compare such a pamphlet with that described above the following is an outline of the possible chapter headings that should be included:

ORGANIZATION
EQUIPMENT
RECOVERY
MAINTENANCE AND REPAIR
SITING,LAYOUT AND MOVEMENT
DEFENCE AND PROTECTION
MAINTENANCE PLATOON TACTICS
COMMUNICATIONS
ADMINISTRATION
TRAINING.

Perhaps this latter treatment is too detailed, on the other hand a maintenance platoon commander in peacetime is likely to be in his first appointment following commissioning. In war time, he is likely to be a direct entry officer with even less experience. Such detail then may not only be desirable but essential.

A great wealth of experience in maintenance platoon operations is currently lying dormant in those officers who have recently held such an appointment. If we are to get the most out of our pamphlets we should tap this source of information to ensure accurate and comprehensive coverage is obtained. Now is the time for past and present maintenance platoon officers to share their experience with others and it is to this select group that this is primarily directed. What do you think we need in the way of a pamphlet? What should it include? Perhaps more important what should it exclude?

Address YOUR REPLIES
To THE EDITOR
TECHNICAL BULLETIN
The RCEME School
McNaughton Barracks
KINGSTON, Ont.

Dear Sir:

In reference to the RCEME Technical Bulletin,Volume 13 Number 2 dated June 1968.

Your article on page 1 to 3 referring to " **The RCEME Memorial Gates"was** very enlightening to me. I had assumed what you had written to be true, but was not sure.

May I at this time, throw some light on the design and construction of the present gates.

The job was given to a LT in his first year of regular service after completion of university.Unfortunately, I can not recall his name at the prrsent time but, I do remember that his home was in the West and that he had served during the Second World War and had gone back to university some time after his release in 1945 or 1946.

The design and drawing of the gates began in 1959 and ran into early 1960. After all the information was compiled and drawings completed the information was forwarded to the Corps Association for approval.

My knowledge of this information is due to the fact, that I was assigned to aid this officer in drawihgs and sketches, that he required.

Yours truly

AJ Beveridge
WARRANT OFFICER

4 FIELD WORKSHOP IN SUPPLY

BY CAPTAIN DFD COOPER

"What's this rumour we've been hearing sir"? burst out WO Maguire standing by the Workshop Parts Counter. "Well" replied yours truly, "4 OFP are disbanding and we'll soon be taking over their Spare Parts Platoon".

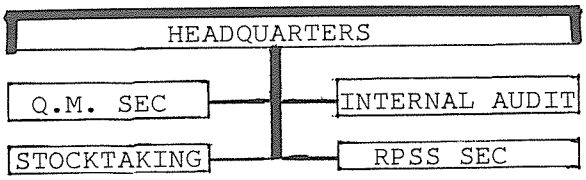
This conversation took place in Jan of this year. The job became a reality during that month and has now been completed. Fifteen thousand line items from 4 OFP RCOC Spare Parts Platoon and eight thousand line items from the RCOC PL of 4 FD Wksp RCEME have been amalgamated. One set of ledgers now reflects the total holding of spares stocked by the new Stores Platoon, and Vehicles have been rewarehoused by stock class into cells, i.e. detail, bin/bulk,bulk grouped by stock class. During the time frame 1 Feb to 15 Apr service to Brigade Units was continued, impeded only by those stock classes closed for amalgamating.

Sustaining both missions involved much overtime work by all incumbents, and here I publicly extend my thanks to all personnel, both Land Ordnance and Supply, who participated in this endeavour. Without their cooperation this project could not have been carried through to completion.

Now the "cheese gets binding". The Workshop has taken on the task of supplying first line spares to units in conjunction with its other commitments. What then does this mean to Land Ordnance, and specifically, mechanized workshops except that some parts will still be hard to get. The best way of tackling this question is by the tried and true method of tabulation.

ORGANIZATION

Reorganization at the RCOC Pl level had to take place, to put all supply functions under the one head, plus do away with the inefficient ritual of closing completely for stocktaking. To facilitate all of this a new Stores Platoon was organized as follows:



The Platoon is commanded by a Captain who fulfills the functions of a Wksp Sup O. All supply matters are of his concern, and his channel of communication is directly to the commanding officer.

COMMAND

The commanding officer of a Mech Wksp now has to take into consideration the supply requirements of units. He should ensure that any decision he makes affecting the workshop as a whole and the Stores Platoon in particular does not jeopardize this overriding factor.

He should also be aware of the ramifications of his policies with regard to the efficient operation of this Platoon, it is unique in his unit in that its mission in life is unlike any other platoon's. Since the Brigade's mobility is a matter of supply and repair working together, he should show personal interest and concern in the working of the Stores Platoon. This necessitates his acquiring knowledge of supply matters.

ECONOMY

The financial responsibility invested with the commanding officer has increased by a few million dollars.

Close scrutiny must be maintained over all supply procedures ensuring that accountability is not jeopardized by expediency. Some times there aren't any short cuts to the supplying of parts; Land Ordnance personnel must be educated to this.

MAINTENANCE AND ADMINISTRATION

The addition of some twenty-eight more vehicles and thirty-three men will

impose a strain on the maintenance and administrative capacity of the unit. This problem will not be an easy one to solve.

TRAINING

The training requirements for supply personnel cannot be ignored, therefore provision should be made for trades training in conjunction with regular general military training.

Parts chasers should be briefed periodically to ensure that they know their job thoroughly, and are brought up to date with any new procedures that concern them.

If Supply and Land Ordnance are to live together successfully in a Land Ordnance environment then officers of the latter branch must be better trained in supply matters. They must be aware of and alert to those areas of their jobs that affect the supply of material and be readily available to discuss their plans with supply personnel.

SCALING

Scaling increases in importance, and a scaling Officer and an NCO should be selected for the Brigade. They should be employed within the Stores Platoon where an interchange of information can take place on a continual basis. The careful selection of scaling personnel will do much to ensure that the maintenance of equipment on either a "programmed", or " as required " basis does not break down through the lack of spares.

TACTICS

Our tactical concept has yet to be tried. An area for 50 odd vehicles is required for the Stores Platoon on two circuits if possible. The fact that units must be serviced, in conjunction with workshop production, adds another important factor to be considered in selecting a site for this platoon.

If I may crystal ball gaze for a moment, an attempt will be made to familiarize all and sundry with our plans for the future.

By the time this goes to print we will have begun delivering spares parts to units. This in static location involves running the parts directly to unit lines versus the tactical concept of Ops. We also plan to provide added service by allowing units to phone their Immediate Operation Requirements and Code 1 demands directly into our offices, and delivering on a same day basis. We encounter the problem here of an additional telephone. On the surface this looks minor, but anyone who has served in Germany will be familiar with the wonderous workings of the Bundespost. Of course with the advent of Radio Teletype the aforementioned problem ceases to exist.

To further daydream, if, in conjunction with RTT we could hook into a computerized system a number of advantages would accrue, not the least being the phasing out of manually posted ledgers; and the maintenance of unit parts accounts. We could initiate a completely automated system designed to "top up" units with spares on a regular basis, while running uneconomical surpluses back through the system.

I agree that all this may be in the distant future but one must not discount the possibility altogether.

The complete impact of the amalgamation of 4 OFP Spare Parts platoon and 4 Fd Wksp's RCOC Platoon has not yet been realized. There are still many unknowns, and problems will present themselves at the workshop daily. However, an attempt has been made to familiarize you with some of these problems, both immediate and projected, in conjunction with our plans for the future.

In closing I can only suggest that the closest cooperation between Land Ordnance ENGINEERING and Supply at all levels must be a reality. We cannot allow employment differences to affect operation; by maintaining a harmonious relationship we will achieve the ultimate aim of providing SERIVCE.

IS MANAGEMENT OVER-EMPHASIZED

By
MAJOR W.R.L. SPRINGFORD

Too many tradesmen in R C E M E are incapable of proper discipline!! Is this a criticism of our tradesmen, or our training system? It must be one or the other that is wrong.

Every serviceman must have the instinct of instant reaction to a command. The classic example is an infantryman who is ordered "over the top". His basic instinct of self-preservation tells him he should stay in his cozy little slit trench. He could get killed if he leaves it! How is this man motivated to get out of his safe hole in the ground and join in the attack? Certainly love of country or even respect for his superior are going to be a long way down on the scale of motivating factors. He is going to go out and risk his life for only one reason short of a bigger than life sergeant personally kicking him out; that is if he has been thoroughly conditioned to react to a command from a senior.

If we accept the requirement for obedience described above, which must be a basic belief of every serviceman, then how difficult is it to extend this requirement into the realm of a tradesman? "Surely this does't apply to a tradesman.....in RCEME!!!" I can hear being rumbled from a smoke filled coffee room in the back of 2xx Workshop.

Certainly it applies to RCEME, and every other corps, trade or branch in the Armed Forces. In RCEME, every tradesman is a soldier. He's not only a soldier first, he is a soldier full time. As well as having expert knowledge in his trade he must be able to man a defensive position as well as anyone else. In these days where fluid battle areas with indistinct front lines are being theorized in pamphlets and practiced in Viet Nam, surely it becomes obvious that administrative and logistic elements can be as easily attacked as front line troops.

But we are not limited simply to the case of a tradesman who may have to fight like an infantryman on his "creepies and crawlies". A tradesman in a battle area may have many functions directly related to his trade that force him into dangerous positions. A vehicle technician may have to recover a dangerously exposed tank or an aviation technician may have to land in a hostile territory to do a quick fix on a downed helicopter so it can be flown out and not lost to the enemy. In any job similar to these, supervisors must be able to guarantee instant response from their subordinates.

Instant response can be guaranteed in an individual only through lengthy conditioning, as was stated earlier. Conditioning such as this can be done only by forcing individuals to do progressively more distasteful jobs. One of the earliest methods of conditioning was drill but certainly there are many other methods available.

There is a theory prevalent, that all soldiers will immediately change to willing, automatic followers in time of war, even though they are exposed to danger. This was disproved and documented in many cases at Dieppe. Since Dieppe was the first encounter of Canadian Soldiers with the enemy, during World War II there are obvious similarities to what we must train for the first encounter of the next war.

Having proved, I hope, to the reader's satisfaction the requirement for instant response from a RCEME soldier (and I use this term generically to include senior NCOs and Officers), and having stated the method used to fulfill this requirement, it only remains now to assess the training of individuals and the currently stressed methods of leadership to determine whether we are maintaining the aim.

Recruit training starts out in the right direction, but then this is required to orient an inductee to the service attitude and way of life. After a short recruit training course of 16 weeks the inductee starts to learn a trade, and this is where the conditioning all but stops. "Who has the time or opportunity to keep after new soldiers on regimental matters when he must be taught a trade", say the technical instructors, "What concern is the odd soldier or platoon walking around camp" is the attitude of those not directly concerned with new soldiers.

The technical instructor will further excuse their lack of attention to regimental details by describing how the best instructional techniques obviate the use of harsh or rigid discipline. The student, must not be disturbed by outside influences. The student must be comfortable.

After this training, and exposure to these attitudes we now have a group ONE tradesman posted to a unit, which in all likelihood has the full time job of maintaining the equipment of a large number of units. Very probably this unit will feel that it's main aim does not permit close supervision of all the new soldiers it receives and will console itself by considering the excellent management techniques that are used to obtain the most work from these soldiers.

But where along the line has the mistake been made???? Surely all the fictional individuals described are not deliberately trying to subvert good order and discipline! Of course they are not. The problem lies with an attitude that has developed in many parts of the Armed Forces and in our Corps specifically ---that management techniques are the panacea for high production rates and better efficiency. Management techniques work in civilian industry, therefore they should work in the services.

The term management techniques when used in this context, means the over-emphasis of a soft supervisory attitude where subordinates must always be treated like flowering prima donnas. The extreme example of this technique is the supervisor who claims that he won't get any work from his subordinates if he does not talk to them politely.

Management techniques can be useful, this cannot be denied; and they can be useful in the Armed Forces. But they do not take into account the unwritten, unlimited liability clause in our contracts that which may be called someday, nor do they replace the discipline that instills instant response. When a man's life is being put on the line, management techniques will not do the job----- only strict discipline will.

Unfortunately the belief exists that if leaders and supervisors are not nice to their men our wastage rate will increase. I do not consider this a valid point although I cannot refute it. However I can demonstrate what happens to an army that does not enforce discipline.

The US Army was changed radically after the second World War by the Doolittle board; which was a high level investigation into claims of low morale of soldiers. Its recommendations did much to democratize the US Army. Unfortunately this process was carried so far that when Korea erupted, discipline was almost non-existent. Consequently in the first few months of fighting in Korea, the US Army had little success. Although there were other reasons included in this lack of success, the lack of discipline in the US Army at that time was documented as being a serious fault.

The Doolittle board had found among other things, that soldiers were unhappy because they lacked some of the rights that private citizens possess. This is a reasonable statement of the problem, but it is not one that can be overcome by removing discipline. Every profession exacts some requirement from receipients of its title. Generally speaking, a doctor or a clergyman are controlled in the manner they dress by the conventional appearance

that is expected of them. Similarly a serviceman loses some of his freedom of action by entering the profession of arms.

I suggest that the annoyance of individuals who find their freedom curtailed, cannot be overcome by relazing discipline. Those who choose not to accept this curtailment will leave, but it is much better to have a small service that is capable of doing its job rather than a large one that will prove to be completely unfit when it comes under fire.

Now how can this problem be solved? How can all ranks be conditioned to react to commands without severely interfering with day to day work? The fault does not lie with the training machine or system; it lies with individuals and their attitudes. The problems can be solved, only by every officer, warrant officer and senior NCO taking his personal responsibilities more seriously and demanding the respect due him from his subordinates as well as ensuring he pays his respect to his own superiors.

Let's get close to home; when was the last time you, the reader, chose to ignore the soldier ten feet away who thought he could get by you without saluting??? When was the last time you did not check a man's dress because of the faint embarrassment involved.

With stress placed more and more emphatically on human relations and management techniques, strict demanding discipline gets further and further away. It is obvious that strict discipline is not a sole basis for a command structure in our Corps, but I hope that it is equally obvious that neither are management techniques the sole basis. We must learn where to draw the line between management of our men and strictly control over them. But, more important than that, is that every supervisor exercises command over his men, consciously and routinely to ensure that the link is still there and operating.

"I don't care if there is a little water in Your Tent! "Orders say "NO Digging", So put that Sod back"!!

TECHNICAL NOTES

ARMOURED RECOVERY VEHICLE MODEL M578

(Manufacturer Bower McLaughlin York)

Two potential dangerous conditions exist:

FIRST:

A protective screen is required over the generator impeller part of the Fan Generator number 2920-895-3417. The US Army has been informed and it is hoped they will provide a standard screen so that the design of Canadian and US Vehicles will remain the same. In any event, a SCREEN WILL BE PROVIDED FOR all Canadian Vehicles.

SECOND:

The traversing foot pedal is mounted close to the door. This location allows an operator to step on the pedal if he is NOT CAUTIOUS when entering the cab. The source of difficulty is unfamiliarity with the equipment.

FREQUENCY METER AN/URM 504

A large number of the 607 heterodyne converters are being damaged by overloading of the input, followed by attemps to repair the damage by unqualified technicians.

Action is being taken to provide a small protective device to prevent overload burnouts.

Caution must be used in applying the signal to the 607 converter as the repair must be done by the manufacturer, resulting in long turn around time and high cost of repair.

BULLDOZER M113 A1

In March 68, DFVE engineering tests and findings confirmed that there is no appreciable changes in traction when every third track pad is removed. Therefore the removal of any track pads from vehicles of the M113 series as an aid to traction is EXPRESSLY FORBIDDEN.

NEW COURSES

The RCEME School is progressing with the design and introduction of new courses based on pay level training rather than group trades pay. These courses are also performance oriented, with theory reduced to the minimum required to do the given task.

Vehicle Company has completed its first pay level 3 Vehicle Technician 411 course and is now conducting a second course. All future vehicle technicians will be pay level trained and will require upgrading to pay level 4, 5 and 6 etc by some method not yet decided.

Armament Company is busy designing a pay level 3 Weapons Technician (Land) 421 course. It is expected that the first course will start early in 1969. The Metals Technician 561 Course Training Standard is being prepared in conjunction with the Air Trades School in Borden. The Machinist Technician 562 Course Training Standard is finished and awaiting validation.

Electronic Company has started work on the pay level 3 Electro Mechanical Technician. The Radar Technician 231 course design based on Radar and Communications School , Clinton has been switched to RCEME School and is to be reactivated. Electronic Company is also providing input to the RCS of S in the design of the Radio Technician 271 and Communications Technician 224 course.

NEW EQUIPMENTS

The School is expecting a 105mm L5 Mountain Gun. This gun is a stripped down version of the 105mm field gun, and is so similar to the latter that equipment courses are deemed unnecessary. It will however be included in future weapons technician courses.

EQUIPMENT MAINTENANCE COURSE (S)

HF SS B RADIO TRANSCEIVER

BY
WARRANT OFFICER KEP TYERMAN

RCEME School has been chosen to teach Eqpt Maintenance Courses on the H.F. Radio equipment being introduced into service.

Canadian Forces have purchased a new H.F. radio set, the AN/GRC 106, to replace the R.S. Cdn 52 and some R.S. C11/R210 stations. The role will be to provide reliable backup communications between units and Brigade HQ, and from Brigade to higher formation HQ.

The AN/GRC 106 was developed for tactical use by the U.S. Army and provides initial long-distance communications when ground forces enter a new area, and enables a commander to maintain radio contact with widely dispersed forces even while mobile.

DESCRIPTION

The AN/GRC 106 is a 2 to 30 mHz, 400 watt peak envelope power, single sideband, transistorized transceiver, consisting of two units: the receiver transmitter RT662/GRC, and the RF amplifier AM 3349/GRC-106.

The RT662 is capable of receiving and transmitting (low level) on single sideband(SSB), AM(compatible), CW and FSK(including narrow shift). Frequency shift keying(NSK/FSK) requires additional equipment. The RT 662 uses a very accurate frequency synthesiser incorporating digital tuning to produce up to 28,000 discrete operating frequencies at increments of 1 kHz between 2 and 30 mHz, with frequency stability of 5x10-8, (±2 cycles at 20 mHz).

The AM 3349/GRC-106 is a linear broadband power amplifier, controlled by the RT 662, and provides 400 watts PEP in SSB and compatible AM or 200 watts average in FSK or CW. Partial automatic tuning is accomplished by broadband techniques. This results in faster tuning, simplicity, and reliability. Additional manual fine tuning is provided to match a 15 ft. whip antenna or alternatively a centre fed diopole antenna.

COURSES TO START

Electronics Coy, RCEME School are to give AN/GRC 106 Equipment Maintenance Courses to Canadian Forces personnel. The courses will be 4 weeks duration with instructors from RCEME and RC Sigs. The first course is scheduled to start in 1969.

The AN/GRC 106 is the first SSB equipment to be issued for field use in the Canadian Forces, and special maintenance procedures and test equipments are being introduced with the set. Testing includes the use of both RF and Audio Spectrum analysers, very stable RF signal generators, and waveform pattern analysers. The Radio Technician meets a completely new dimension in specification testing with frequency accuracy rivalling the Beckman counter(counter must be calibrated within 5 weeks prior to specification testing) and with the most sensitive field type receiver in service. Gone are the days of IF alignment, with fixed filters and broadband amplifiers replacing the old type tuned IF stages.

It is expected that the AN/GRC 106 will have less teething problems than normal as the set has been in active service in Vietnam for some time. I Cdn Sigs Regt have eight AN/GRC 106 stations on user trials. They have proven very reliable and provided excellent communications during the Voyageur Canoe Pageant, and exercise Pratorium Pacis One (link between Kingston, Ont. and Porto Rico)

This radio can be installed in a Truck utility 1/4 ton, Truck utility panel 3/4 ton, and Carrier armoured command post, M577A1

FIRE CONTROL INSTRUMENT COURSE

BY
WARRANT OFFICER LJ KROEKER

The trend towards greater mobility of the Canadian Forces necessitates the constant introduction of new equipment.

The newest addition at the RCEME School is the 155 mm Self-Propelled Medium Howitzer M109. The arrival of this vehicle, and its associated equipment, introduced a new course for Instrument Technicians to be trained in the maintenance and repair of fire control equipment for the M109.

The first course at the RCEME School, had students from Gagetown (3) Petawawa (1), Soest (2), Shilo(1) and RCEME School (3). Mr. W. Nye from Letterkenny, Pennsylvania USA was the instructor. Bringing this instructor to the RCEME School was more advantageous as it allowed more students to attend the course.

The course included the complete disassembling and reassembling of the Panoramic telescope M117; Elbow Telescope M118 C; Quadrant M15; Telescope Mount M145 and the Mount T206; levelling of the trunnions and turret, and alignment of the mounting plate prior to installation and alignment of the instruments.

Before installation of the instruments, the vehicle must be level, therefore, hard standing is necessary. A plumb line is suspended in front of the piece at a height sufficient to elevate it to 1300 mils while tracking the plumb line.

To level the vehicle, three 20 ton screw jacks are required and placed two forward and one rear. The trunnions are levelled with the front jacks until the tube, fitted with cross lines on the muzzle, will track the plumb line. The turret is levelled by placing a level on the inside turret ring and rotating a turret through 360 degrees. The artificers method of levelling is used. The end result is the cross lines on the muzzle are again superimposed on the plumb line. To level the mounting plate an adapter telescope M60 to carry a telescope and a level is mounted in place of the Telescope Mount M145. The mounting plate must be level in all planes and the telescope is sighted on an alignment chart set out 50 feet in front of the vehicle. The adapter telescope is removed and the Mount Telescope is mounted. With the Quadrant mounted, the Mount Telescope and Quadrant are brought level to the pads on the breech. The Elbow Telescope and the Panoramic Telescope are placed in their respective mounts and are aligned with the alignment chart. This of course is all done after the instruments have been tested and adjusted in the shop with the use of the special tools, adapters and test equipment required for this purpose. One handicap on the course was the lack of special tools, adapters, and test equipment required to test, adjust, and align the instruments. Therefore, many questions were asked and the instructor spent much time in describing procedures involved.

The levelling of the vehicle prior to installing, testing and aligning the instruments to the mount is essential for accuracy. The complexity of the inspection, maintenance, and repair procedure, demands the knowledge and skill of an EL MECH 431.

Mr. Nye was a very capable and resourceful instructor. He demonstrated in detail how to carry out tests and make adjustments, without the complete range of specialized test equipment.

SECOND PHASE TRAINING

BY LIEUTENANT HT HIGUCHI AND LIEUTENANT RJ PORRITT

This summer's 2nd Phase Officer Cadet Training was unique in two respects. First, as a result of the cancellation of their programme, there were no COTC cadets. Secondly three commissioned officers attended this training which is a requirement for the Subalterns EME Course in the fall.

As has been normal for this course, the summer was spent in the various training companies of the School, with the intention of giving the young officers an idea of the work that RCEME and its technicians do.

The first few weeks were spent at Regimental Company, where the students were exposed to the administrative aspects of RCEME by learning more of the ever present staff duties. Along with this was incorporated the more "gung-ho" side of RCEME beginning with a review of basic infantry tactics, leading to the roles of RCEME in the field; the dispersion, concealment and movement of a workshop. This all culminated in an actual exercise in the field which utilized all the knowledge gained in the classroom. Added to this was a week of driver training, designed to qualify sufficient drivers for vehicles involved in the field exercise. Traditionally, the last day of driving is used for the truck rally, where the tireless patience and loving guidance of the driving instructors, is rewarded by a massive mix up of lost, broken down and wrecked vehicles. This year, the incident rate was extremely low, amounting to some lost "panic instruction" and one flat tire.

The next two weeks were spent at Armament Company where, despite the extremely hot weather and frequent "stand-downs", the officers were acquainted with the technical skills in weapons, instrument and artisan platoons, where exacting inspections are a major factor.

The next week was approached with much apprehension by the members of the Course, for it was to be spent at Electronic Company, where they expected to be filled full of radio and electronic theory. However, they found the time at the Company very interesting and challenging. Each student built his own small radio, (under supervision of course) and tested the various sections and stages after learning the theory behind it. This showed many a budding young engineer the intricacies of working with their hands, and brought him to appreciate the skill and precision of the RCEME Tradesmen.

The last company to be visited was Vehicle Company, where ten days were spent inspecting, learning about and operating everything from a bulldozer, jeep, armoured recovery vehicle and tank. The most interesting day was spent driving the M109, self propelled 155 mm howitzer, the M578 armoured recovery vehicle, the Centurion tank and the M113 A1 personnel carrier. A day was also spent in doing actual field recovery with RCEME equipment. This brought the student near to the end of the summers training. Students kept fit by daily physical training and sports, and a full schedule of weekly parties and/or get togethers at the mess. The members of the course plunged readily into their final week at Regimental Company. Practices for the graduation parade and final administrative clearances took up the last few days of the course. On the graduation parade, the awards for proficiency during the summer were presented to the following: the General Proficiency (2nd Phase) Trophy was awarded to LT R.J. Porritt who acted as platoon commander on the final parade; best ROTP cadet was won by CDT P.G. Whittingham, who filled the position of platoon sergeant; the Technical Achievement Trophy was awarded to CDT K.I. Hamming, and the RCEME School Athletic Achievement Trophy to CDT E.C. O'Neill. After the parade, the usual rush for final clearances, course reports and quick farewells provided a busy ending to a rewarding and enjoyable summer at The RCEME School.

SUBALTERN EME COURSE 1968

FRONT : TS WRIGHT; JA MACDONALD; DW CLARKE; PD KERR; EG LAMARRE; JJ MARLEAU; PT BURMAN;

CENTRE : JM LAROCHE; JA TURMEL; GT BINGHAM; RE LIGHTLY; ET HIGUCHI; MA CAMPBELL; ED GERHARDT;

BACK ROW: JA DUCHESNE; T KOPLYAY; RJ PORRITT; TP LYDON; SA SHEWCHUK; JP WILLIAMS; RJ POWELL.
JJ GAGNON

HOW TO STUDY

BY
CHIEF WARRANT OFFICER J SILZER

WHY DO YOU WANT TO STUDY??? YOU want to get ahead, be better informed,have a broader understanding of the world you live and work in. Learning is something you have to do for yourself.

Establish a regular study habit, by having a set time and place,free of distracting noises. If possible you should be alone and have on hand all the materials you need. The definite place of study should be your own room,corner, or spot. Learn to shut your mind to everything but what you are reading or studying.

Set a time to start and stop your study.The most important thing is regularity. Do not make the study periods too far apart and above all do not miss a study period.

When you have studied for an hour,take a five minute break.Relax by getting up and stretching. Think over what you have read. Then go back for your next hour session.

At first you may find it hard to keep your mind on your work. Or you may grow sleepy. The trouble is your mind needs setting up exercises. Keep at it. Soon you'll find your mental processes are limbering up and study comes easier. If what you are reading does not involve complex formula or detailed description of processes, you will soon find you can grasp most new ideas in a text in one evening.

LEARN TO READ. Here is how to get more from what you read.

FIRST: Glance through the outline at the beginning of the text, then note the headings and subheadings. This will give you an overall idea of the content and the main points.

NEXT: Read an entire section at your own rate but as rapidly as you can grasp the meaning of it. This is called orientation. It means getting a rough idea of what the subject is all about.

AFTER THE FIRST READING of each main section of several pages, close the text and run over in your mind what you have read. On which points have you only a foggy impression? In this way you will discover which main points you have not grasped.

NOW GO BACK AND STUDY THE TEXT. Spending more time on those portions that you did not get on first reading. This time under line the key sentence of each paragraph.

IF YOU DON'T UNDERSTAND a statement,a formula or a problem right away,you'll find that its meaning will clear up as you read on. If it isn't clear then go back until you have mastered that point. Otherwise what follows may be equally hazy.

WHERE A CALCULATION IS INDICATED in a text do not merely accept the solution as correct but examine it step by step, making sure you understand how the answer is obtained.

PRACTICE PROBLEMS are given in many texts, to help you. Work carefully through each of these complete examples. Don't miss a single step.

ANY COURSE OF STUDY IS LIKE A chain, the texts, chapters, paragraphs, formula,etc are comparable to each link in a chain. Tests examine each link under stress. Will your chain hold???

SPRAY BOOTH

BY SERGEANT FA LUSK

The instructors of Body Repairs in the RCEME School ended a three year wait on 5 July 1968 when the first vehicle was painted in their newly acquired spray booth.

Automotive refinishing is taught as part of the Metals Technician trade at Armament Company, and until this time painting was done using the facilities of Base Maintenance Section Kingston. Now with the acquisition of a new spray booth at Armament Company every training minute can be fully utilized

Acquiring the spray booth was an experience and there was little room for those with no patience. The choice of size and type of spray booth was left to myself as instructor. It was fortunate that in January of 1965 when this began we had an excellent OC, Major MacGillivray who with MWO Broomer, pushed the paperwork so that authority was granted to have a booth. Then began a long frustrating wait. This gave Mr. Powell, (retired Sgt) and myself an opportunity to attend two different courses on spray equipment at the DeVilbiss Company, the manufaturers in Barrie Ontario. To the instructor at DeVilbiss and their staff go much credit for the hours of instruction, books and in particular the cut-away spray gun models donated as training aids.

Finally in late 1967 a semi-trailer truck backed up to building A33 and unloaded 6000 lbs of spray booth, with a book of instruction on how to assemble it. After consulting with Base Construction Engineering Section it was decided, since they were short of personnel, only two men would be available to help errect and calk the booth. The two men detailed-SGT Lusk and Mr. Powell. Fortunately we had been taught blueprint reading as there was a book full. One lesson learned from past experience, "when in trouble contact the experts". DeVilbiss to the rescue, in the form of Mr. Ron Carter. This was one of their booths; they were here to help; and help they did, in guiding us through the first stages of erection. We even had a visit from the factory instructor to see if he could aid us in any way. Mr. Carter, who is now the service man for DeVilbiss in this area, calls monthly to ensure we are encountering no problems.

When the labour had been completed, RCE personnel installed lights, exhaust fan and the air compressor. The inside was painted with a strippable plastic coating in order to facilitate easier cleaning of walls and ceiling. The floor was coated with Konducto Wax. This wax, besides reducing static electricity and making a non-slip floor, absorbs spray dust. When it has reached its absorption limit it becomes hard and brittle making it easy to scrape off and apply another coat. This makes a clean spray booth and reduces fire hazards.

When all was complete the end result was one of DeVilbiss' latest models of standard commercial truck and car spray booths. It measures 28 ft. long, 14 ft. wide and 12 ft. high. Some advantages of this booth are: the entire front including the doors are covered with fibre glass filters, which ensure adequate air flow; this booth has a solid back with exhaust ducts reaching to the floor in each corner with three sets of paint arrestor filters mounted in each; air is drawn in through the front of the booth down over the vehicle where spray dust is picked up at floor level, filtered and discharged out at the top of the booth by a 42 inch fan; lighting is excellent with 18 sets of double tube fluorescent bulbs making the booth almost shadowless. The lights are installed from outside the booth which makes servicing easy and convenient.

A group 3 Metals Technician course was the first to use the booth and the first students who used it were CPL Osborne and PTE Mainville. The vehicle painted was a 1963 Plymouth.

The addition of this spray booth and its installation in Building A 33 next to a wash rack makes the teaching of Automotive Refinishing almost a pleasure.

RCEME IN THE FIELD

BY SERGEANT FM REID

We rolled along o'er hill and dale,
heading out for unknown territory
To set up camp ahead of the damp;
A task we felt was meritory.

Along the winding river,
Beside lakeshores still and calmy,
Across the plain - no sign of rain -
With the feeling we must be "balmy".

It was somewhere near the midnight hour;
We'd arrived at our destination.
"Chilcotin at last," we shouted enmasse,
Forgetting our former frustration.

And so to the job for which we'd come;
A Workshop in the Field.
With Vehicle Mechs and Welding Techs
And anyone else who could yield.

To others who were standing by
they gave them hammer and nails
To set up the biffies,neat & spiffy
One for women and one for the males.

Down at the Control Office tent,
We were having our problems, too.
With a lot of orders, coming in from
headquarters;
To sort them out was our due.

A timetable must be posted
With orders to "Look alive"!
Breakfast at seven,lunch after eleven,
Suppertime - half past five.

There will be time-off for recreation -
Swimming, if you wish.
The Mess will be open for those who are
hopin',
The rest of you can fish.

Now there was a certain group-
A Truck Panel they did take.
They rode off together, regardless of
weather,
With tackle to fish in the lake.

Master Warrant Newbold was driving;
While the rest of us sat in the back -
Sergeants Nelitz and Gollan, Wiens &
Wilson
Not to mention Captain "Tak".

The lake had been stocked with trout;
A paradise you will agree.
With each of us trying to get fish for
frying.
Who'll be first? Wait and see!

Sergeant Gollan was the one
To get the fish to bite.
With a mighty throw, he had a trout
in tow
And a fish story to tell that night!

Then Sergeant Wilson decided
To get a better position.
So spying a float,and having no boat,
Took off on his leap to perdition!

One end of the raft went up
And our Sergeant Wilson went down.
The only thing, you can bet, that did
didn't get wet,
Was the rod in the hand of the "clown".

The air rang with our laughter
While Doug did his lively step.
One was bend double having some trouble
Now two of us was wet!

Back to the mess we did go.
'Twas the end of our fishing excursion.
No time to waste,with a fish to taste
And get dry by the "Nelson-Herman".

Then the six of us sat down
To revel in the RCEME name.
A fresh trout repast, a drink in our
glass,
And "Crib", a quarter a game.

And so the days went by
With RCEME hard at work.
A baseball parade and horseshoes played.
No duty did we shirk!

Now the time had come for departure.
The end of the Camp was nigh.
"Twas the first of September, I will
remember,
The day our Convoy drove by.

We've had some good camps and bad,
But this one, we'll never yield.
Was the best of them all. "We've
had a ball!"
Oh! Mighty RCEME in the Field!

EDITOR'S NOTE:
Names have not been changed other than Captain "Tak", who is Captain Takasaki. SGT Nelitz is SGT Reid by marriage.

ADVENTURE TRAINING

BY MASTER WARRANT OFFICER FT ALLEN

Participants were

WO FT ALLEN (Fred), MWO NL ARSCOTT (Norm), MWO DF KNIGHT (Don), WO LR KALYNIUK (Kal)
WO RG KERR (Bob), WO AG LOWE (Art), WO AR SLAUGHTER (Russ)
WO JS STABLES (John), SGT KL MOORE (Ken)
CPL RWG DONESLEY (Rick)

We made it. Ten men from the RCEME School took off on a three day canoe trip and all got back. Bruised, blistered, battered and beat, but back.

It all started last June when Russ and Ken devised a scheme for canoe trips during recreational training periods throughout the summer and a longer trip Labor Day Weekend. A detailed plan was submitted and approved as "Adventure Training". The first afternoon was purposely planned to include several portages to eliminate those not seriously interested. It is notable that no one quit except one who was posted.

Many were involved in the preparations for the three-day trip. John and Glen prepared the route detail. The only fault in the plan was passing through Ardoch, the only town on route, when nothing but the general store was open. On second thought. Was anything else there?

The total distance covered was forty-four miles, passing through nine lakes and connecting waters. Much was learned by the less experienced. Combat clothing was found to be perfect for the venture, boots gave excellent footing in some difficult situations.

Sleeping bags, air mattresses and rations were provided by QM. The canoes were privately owned. The loads on each portage seemed lighter than the last one. Someone said that the rations were eaten thus lightening the load. I think we were getting numb. To quote Bob "Let's eat and lighten the load". Two ounces of "snake repellent" was sufficient each night just before retiring. Very effective-no one bitten by snakes.

Norm was the ranking member and spent many anxious moments contemplating Boards of Inquiry as the band aids were being issued. Seniority has its privileges though. On the second night only one moth fell in the tea and Norm got it.

All were members of the Sgts' Mess except Rick. He knocked the cooking water over anyway-twice the same day.

Canoeing has its bad moments and I was prepared to encounter rapids, bears, etc, but my worst moment was on the first night at supper when some were barraged with Irish stew. Don now knows the lid on the can is not a handle. Don and his partner, "Kal" got the prize for the most water in their canoe. At fishing John took the prize. Swimming was good but there always seemed to be someone "pressing on".

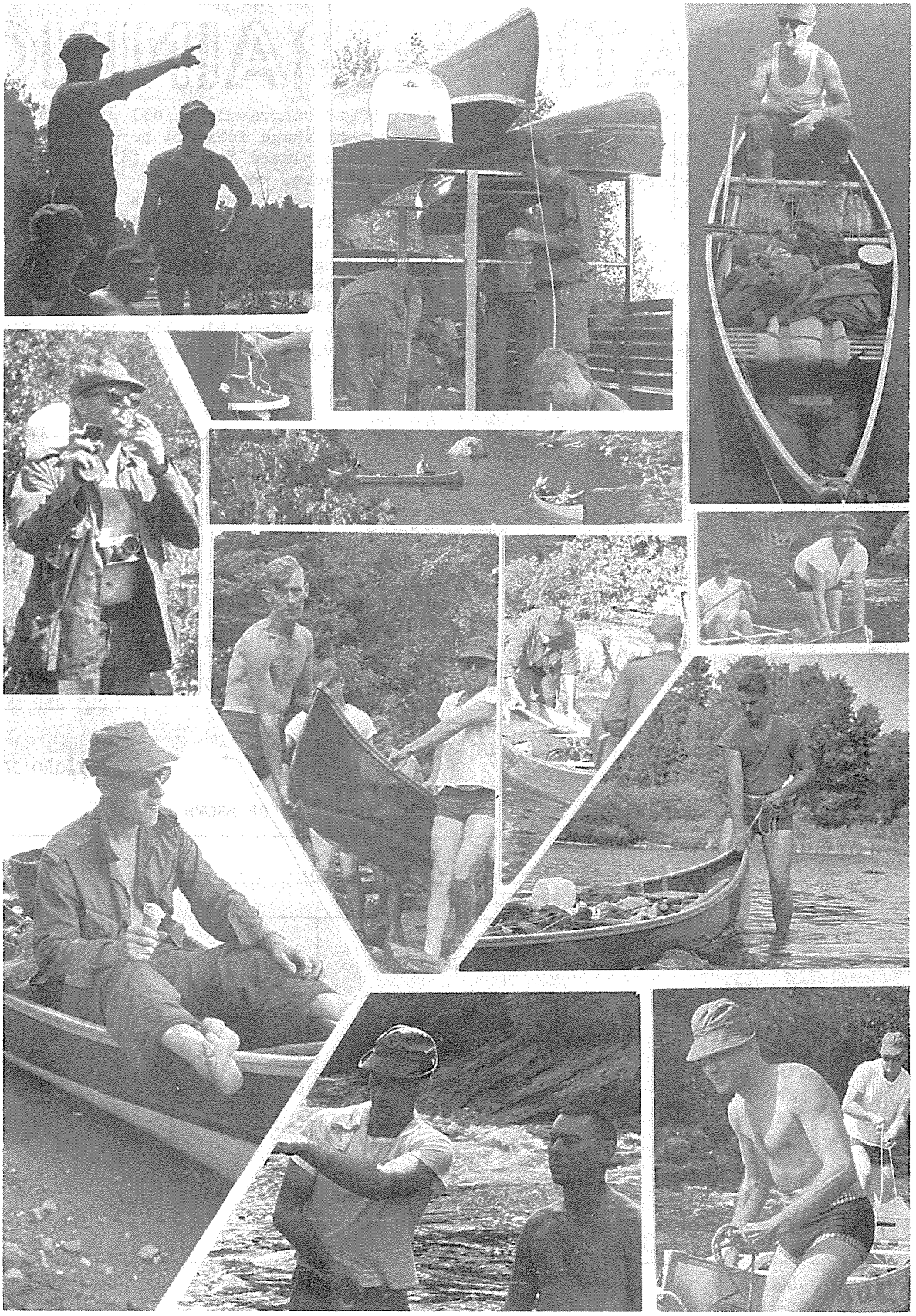
Anyone setting out on one of these ventures should acquaint himself with the contents of the different ration packs. If you're not careful you can trade yourself into a pretty sad diet.

The group got along very well; there were moments of stress as when one member said "follow me, I know this area" and promptly led everyone around an island.

Numerous pictures were taken but some of the most notable moments weren't recorded for example, your partner in full portage order falling backwards out of the canoe.

The average age of the participants was 38.8 years. Everyone was a swimmer and safety was a prime consideration.

We will keep the group active during winter in other activities and physically fit for the next adventure training.



RECREATION TRAINING

For the first time in CORPS OF RCEME's history has THE RCEME SCHOOL placed first in the ZONE TRACK & FIELD MEET. Participants made this possible by voluntary efforts and regular Recreational Training.

Recreational Training every Thursday afternoon, produced a very high standard of physical fitness. This standard made it possible for some to enjoy the thrills generated for a winner. Less successful participants share the thrills as a reward for their competative drive to produce a winner.

RCEME congratulates all participants and regret that space does not permit the listing, of all who placed fourth, fifth, sixth etc. However special mention is warranted of LT. DD Dorman. He captured his second straight "National Track and Field" title. He was a triple winner who retained his high jump (6 ft) and long jump (20 ft $5\frac{1}{4}$ inches) titles. He took the discus event (121 ft 3 inches) and anchored the 4x440 and 4x110 relay teams. His efforts earned him the trophy for the high individual,high aggregate for track and field.

MEET CANADIAN FORCES	EVENT	FIRST PLACE	SECOND PLACE	THIRD PLACE
KINGSTON BASE	High Aggregate (Track & Fld)	CDT RE WHITE		
	High Aggregate (Fld)	LT DD DORMAN		
	100 yards	PTE ES MAKI		
	220 yards		PTE ES MAKI	
	440 yards		CDT GA GRENFIELD	
	880 yards	CPL MJJ COLETTE	CDT EC O'NEIL	
	1 mile	CPL MJJ COLETTE	CDT RE WHITE	
	3 mile	CDT JR JACKSON		PTE KM RHYNO
	6 mile	PTE KM RHYNO	WO O BRADLEY	
	Shot Put			CDT JHD MORIN
	Hammer Throw	CPL AJ ROGERSCN		
	Long Jump	LT DD DORMAN		
	High Jump			PTE GRO INNIS
	Discus	LT DD DORMAN		
	Pole Vault	LT DD DORMAN	LT BB BROWN	
	4x110 Relay	RCEME		
	Team Members:	LT DD DORMAN CDT PG WITTINGHAM CDT AP TREMBLY PTE ES MAKI		
ZONE 5 at KINGSTON	High Aggregate (Fld)	LT DD DORMAN		
	High Aggregate (Overall)	LT DD DORMAN		
	100 yards		PTE ES MAKI	
	3 mile		CPL MJJ COLETTE	
	6 mile	PTE KM RHYNO		CPL MJJ COLETTE
	Discus	LT DD DORMAN		
	Pole Vault	LT DD DORMAN		
	High Jump		WO IR KALYNIUK	
	Long Jump	LT DD DORMAN		
	Hammer Throw		CPL AJ ROGERSON	
NATIONAL at CFB UPLANDS	Discus	LT DD DORMAN		
	Long Jump	LT DD DORMAN		
	High Jump	LT DD DORMAN		
	High Aggregate (Fld)	LT DD DORMAN		
	4x440 Relay	RCEME		
	Team Members:	LT DD DORMAN CDT GA GRENFIELD CDT EC O'NEIL CPL MJJ COLETTE		

MY DERE SUR

BY SERGEANT RJ POTTERY

It is not my intention to attempt to change one's style of writing or even change his idea of how a word should be spelled, or is the word spelt?My wife tells me that it is more romantical, or is the word grammatical,to write spelled. Whatever it is, as long as you understand, so to speak.

Now then, did you ever hear someone say Perishonell Office? I'm sure you have.And sometimes you even hear Personal Office.You guessed it, I'm an office clerk and by George, I've seen many a letter from the highest to the lowest station commence their letters with "Dere Sur","Dear Sire" or "MY Dear CO", very archaic to say the least wouldn't you say?

But the endings are really the end. They sign themselves, "Yours Attentively" Yours Hopingly","Yours Sincerally",and get this, "Lovingly Yours".

Letters that would make my old English teacher tear her hair out. Actually I've lost count of the times I've come across, "I were" and "you was". Honestly, if I offered some chap a preposition,he would think I was giving him a job.

Not all use bad grammar, bad spelling or writing, but these are few examples. Taking writing for instance, man, my pet worm could do better. I've seen letters that look as if they had been written by a Greek waiter in a Chinese restaurant.

It is most surprising and certainly saddening when one has completed high school, has spent long hours obtaining that all important Bachelors or Masters degree and then winds up righting -- sorry, writing in such a fashion that no one, but no one can obtain a shred of meaning of what he is trying to write,without employing half a dozen people to decipher,re-phrase and then and only then arrive at a clear, concise thought.Maybe it's time we paid a little less attention to all the fripperies in units today, and a little more on the three R's.

Before clerk folk like me get crosseyed,everyone ought to remember Kipling's little verse:

I keep six honest serving men,
They taught me all I knew
Their names are What and Why and
When and How and Where and Who.

It is not necessary for all your six men to be used in that order but to plan a good solid letter they must all be employed.

Good writing never did follow a knowledge of grammer. The rules of grammar were deduced from good solid writing. Shakespeare never saw an English grammar book. But he did remember the "how" and discarded the "why". Remember this dynamic verse:

I remember, I remember
Those first aspiring years,
The mastery of analysis
I won with blood and tears,
I could not parse a sentence now,
Alas! 'tis little job
To know I'm further off from
syntax
Than when I was a boy

Self-confidence is enhanced by the mastery of words and their proper use in conversation and correspondence. One should, when writing, use the opportunity for building one's future,that is to say, turn it into a personal advantage.

The written word is a medium of creative expression and has many roles. to play. These roles, may enlighten or bewilder or make one laugh or cry. In order that the most effective meaning may be conveyed to the reader,the writing must be clear concise and logical and there is no short cut.

Good writing is the product of copious quantities of paper,ink and midnight oil. You who have the ability to combine words effectively have an asset that will serve you well in all walks of life.

RCEME MUSEUM

HAVE YOU SEEN THIS LAMP

The above desk lamp was presented to the RCEME MUSEUM by Major RJ ESDON (retired) in June 1965. It was made in 1944 when Mr. Esdon was a RCEME Major. Its construction illustrates RCEME wartime versatility most of which(we hope) has been retained by our present Craftsmen.

The base is made of scrap alloy obtained from obsolete lewis gun cooling fins. These were melted on a blacksmith's forge using a non-servicable sauce pan as a mould. The casting was then turned to shape.

The bronze base for the column is a non-servicable radio aerial support from a Bren Gun Carrier turned to shape.

The column is a two-pounder flat-head projectile found on the artillery range of Dundurn Camp in Saskatchewan.

The bronze shell support was machined from material obtained from a hub of the obsolete artillery wheels used on the 18 pounder field gun.

The mortar shell is a drill round (sand filled) and is mounted in the bronze support at an appropriate angle.

It may be removed readily from the support as the lamp cord bypasses the shell in the internally machined recess provided for that purpose.

The lamp shade is an early type of "tin hat" used in the First World War and the early stages of World War II. It is mounted by lining the chin strp with a strip of metal to support the helmet.

LAST OF THE APPRENTICE

BY CAPTAIN DM LANGLEY

At 1042 hours 27 Jun 68, 21 Apprentice Soldiers marched past the saluting base in slow time to the tune of "Auld Lang Syne"; thus ending 16 years of Apprentice Training at THE RCEME SCHOOL.

Since Oct 1952,1010 Soldier Apprentices had been enrolled. They stayed for periods of time ranging from two weeks to twenty four months. some"left" when they found the service was not their "piece of cake", some requested release for the same reason, others were released as unsuitable and 696 graduated.

Of the 84 Apprentices enrolled in the 15th Intake (including 13 French speaking Apprentices who took their first year training at RCOC School Montreal),31 graduated,21 were converted to serving soldier status in RCA,RCAC and RCEME, and 32 were released. Twenty Apprentices qualified for a Secondary School Diploma (Grade XII T), an all time high.

The weather was not on our side and for the first time in years the parade was held in the Drill Hall. In direct support of the Apprentice Platoon was the RCEME School Band under the direction of MWO WWB Monkman.

The weather did not improve at all during the day but the ex-Apprentices hosted their parents to tea, lunch,tours of the trades companies and museum, and completed the day with a rousing graduation dance.

Distinguished persons in attendance for the final Graduation parade were:

Colonel AL Maclean,CD-Commandant The RCEME School and the Inspecting Officer.

Colonel CW Jones, CD (Retired)-Commandant The RCEME School when the first Apprentices arrived.

Major GL (Shorty) Lodge, CD (Retired) - the first OC of Apprentice Company.

Major WA (Wally) Downs, CD (Retired) - a former OC of Apprentice Company.

Major AR (Art) Thomsen, CD-also a former OC of Apprentice Company.

Captain DM (Dennis) Langley,CD the last OC of Apprentice Company and the only Infantryman to command the company.

YOU TOO CAN WRITE

By
CHIEF WARRANT OFFICER J SILZER

Modern communications allows us to do business far removed from immediate locales.It is vitally important that letters project the best image.

The use of cliches, archaic or hackneyed expressions head the long list of reasons for poorly written letters.

To be sure you are producing good correspondence, review copies of recent letters. Errors will stand out.

Make your letters effective. Pretend you are the recipient of the letter then select your words and phraseology effectively.Use language the recipient can understand. Know your subject. Write your thought in logical order. Be natural. Give special care to composing the opening sentence. Express exactly what you want to say. Keep related subjects together. Use short sentences and paragraphs. Get to the point. If you have made a mistake say so. Be careful with the closing statement;.... especially the last sentence. ITS ECHO LASTS.

Remember you cannot see a smile or chuckle on a piece of paper. Avoid things which could be misinterpreted.

> "You are a rough fellow to deal with", may be fine where a smile on your face can be seen; BUT on paper it could be devestating.

A BIRD IN HAND

BY MAJOR P BATESON

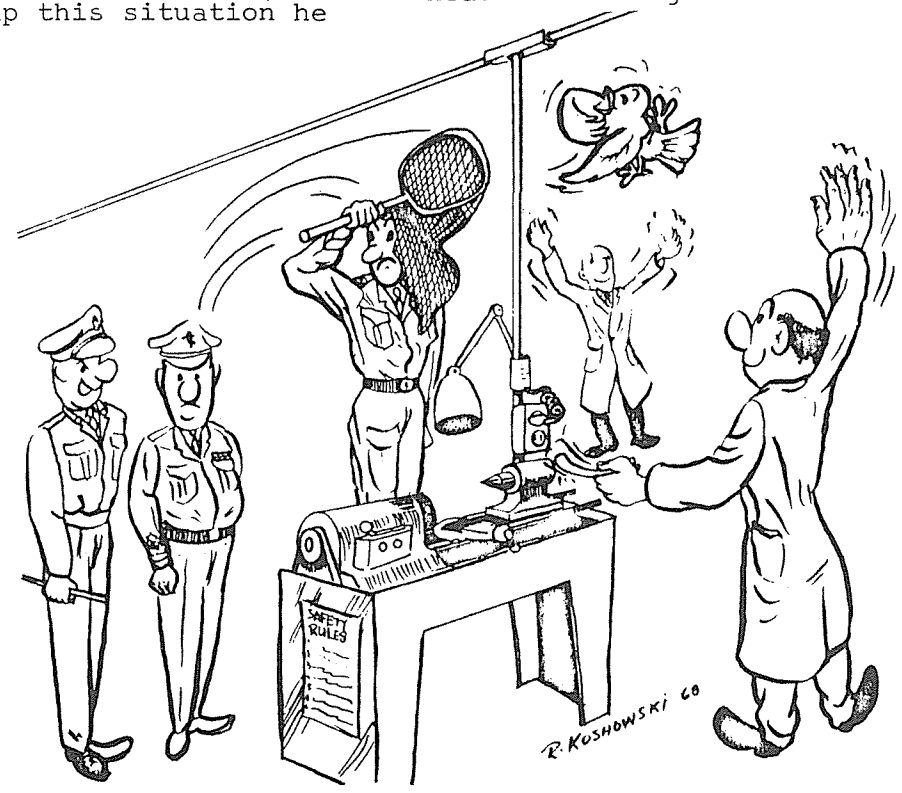
Being a day in the life of the Exchange Officer at the RCEME School
Major MS (Mac) Caygill

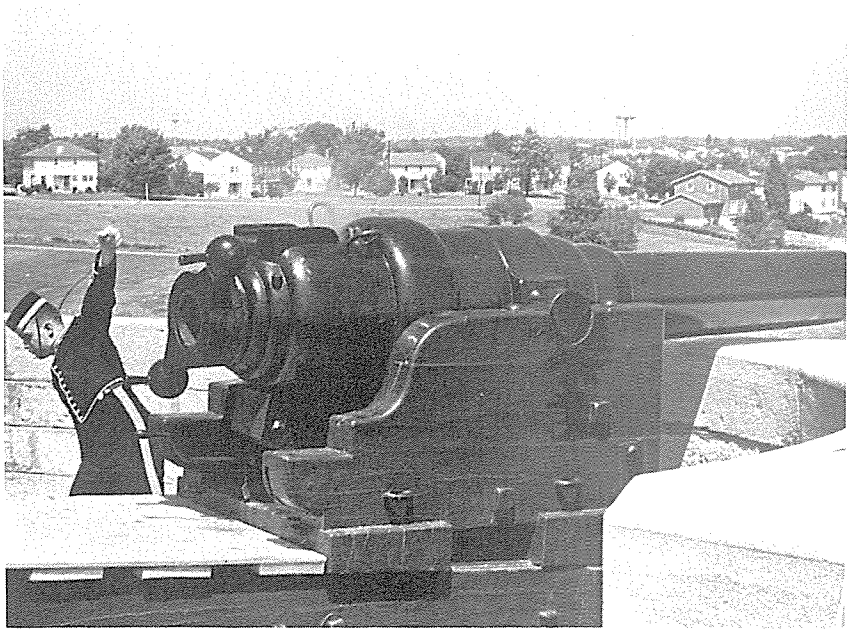
The British, as we all know, are great nature lovers, hunting buffs and bird watchers; which probably explains why Mac took such an interest in the efforts of a group of his WOs and NCOs trying to corner an escaped budgerigar.

The budgy had apparently strayed to the RCEME School and took refuge in the Armament Company Building. Seeing this obviously valuable bird ($2.50), just begging to return to captivity, the NCOs clustered around and tried to seize the poor defenceless thing. This unusual activity amongst the lathes and shapers, not unnaturally attracted the attention of the ever vigilant Company Commander Mac Caygill, who, we understand, fearlessly stepped forward and demanded an explanation.

It was immediately obvious to him that he was dealing with a bunch of ham fisted amateurs, with little idea and no knowledge of the finer points of beating, hunting and netting. Seizing up this situation he rapidly despatched one of his avid fishing WOs to bring his landing net. Seizing this in his right hand and waving it like a battle flag he directed his WOs with the left hand to beat the lathes and drive the bird into a corner, where he would attempt to net it, much like a butterfly.

The hunt was on. The WOs entered into the spirit of the exercise, and doubtless, no stretch of Scottish moor was ever beaten so thoroughly nor so conscientiously as were the lathes of Armament Company. The cover was raised, the budgy was headed for capture, suddenly the beaters stopped beating and the bird stopped flying. The Company Commander with the net raised and poised for the kill whirled around to discover the reason for this sudden pause.....It is very difficult to salute the Commandant when you are hatless, charged with the excitment of the hunt and holding a fishing net above your head in the right hand.





THE OLD AND THE NEW

A series of misfires by the old artillery pieces, resulted in Mr.Brais,the manager of Old Fort Henry, requesting assistance from THE RCEME SCHOOL. Lt AB Fuller, MWO GG Meisner and Sgt DJ Alfred, all of Armament Company, applied their collective knowledge to the problem. Despite the unfamiliar equipment involved they were able to advise and assist the Old Fort Henry Guards, who are now obtaining better and more reliable shots from the old artillery pieces.

The gun shown in the photograph is a 7 inch Breech Loading Armstrong Gun on a Dwarf Traversing Mount.It was manufactured in 1862 and carries a Queen Victoria Royal Cypher.It is one of the first such guns to be manufactured, and only three exist in Canada today.

RM Koninck